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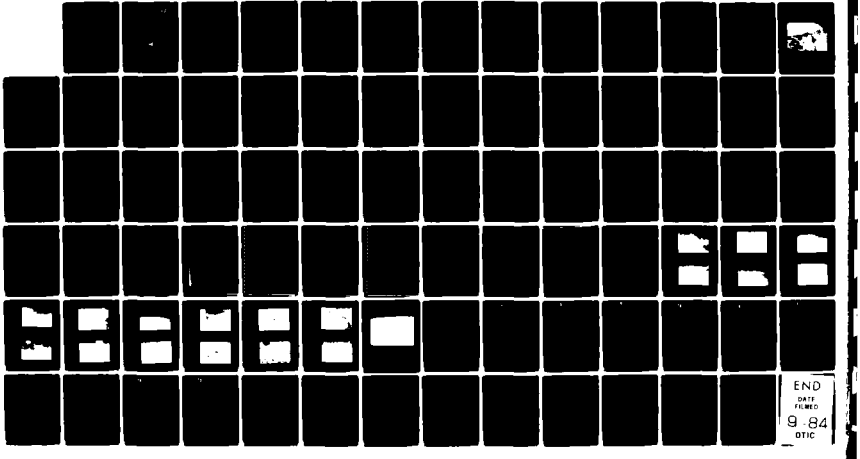

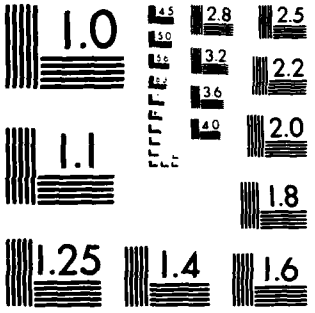

QUINNIPIAC RIVER BASIN
SOUTHINGTON , CONNECTICUT

# PLAINVILLE RESERVOIR DAM
# CT 00259

# PHASE I INSPECTION REPORT
# NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM , MASS. 02154





JANUARY 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Quinnipiac River Basin
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Plainville Reservoir Dam is an earthen embankment dam with a maximum height of 17 ft. and a length of 688 ft. In general, the dam was judged to be in fair condition. The spillway is not adequate to pass the 0.5 PMF test flood outflow without overtopping the dam. The test flood would overtop the dam by about 0.2 ft.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF

NEDED

MAR 01 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Plainville Reservoir Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Plainville Water Company.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

# PLAINVILLE RESERVOIR DAM

CT 00259

QUINNIPIAC RIVER BASIN

SOUTHINGTON, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

| | |
|---|---|
| Identification No.: | CT 00259 |
| Name of Dam: | Plainville Reservoir Dam |
| Town: | Southington |
| County and State: | Hartford, Connecticut |
| Stream: | Tributary - Quinnipiac River |
| Date of Inspection: | 23 October, 1979, and 15 November, 1979 |

## BRIEF ASSESSMENT

Plainville Reservoir Dam is an earthen embankment dam with a maximum height of 17 feet and a length of 688 feet. A concrete spillway section, 15 feet wide, is located near the left abutment. The upstream face has a slope of 1.5:1, and is protected by riprap. The downstream face has a slope of 1.5:1. There are two 6-inch diameter blow offs located adjacent to the two gatehouse structures located downstream of the dam.

For the past several years the reservoir has not been used actively for water supply, but has functioned as a standby reservoir. Plainville Reservoir has a storage volume of 528 acre-feet; the size classification is thus small. A breach of the dam would affect about 15 residential homes along Flanders Road and Shuttle Meadow Road. With the possibility of some loss of life and the probability of significant economic losses, the dam is classified as having a high hazard potential.

In general, the dam was judged to be in fair condition. The vertical and horizontal alignment is good; however, a slight dip in the crest was noted in the vicinity of the downstream gatehouse. Several windows were observed in the upstream riprap, which ends about 2 feet below the crest of the dam. Some small seeps were observed near the downstream slope (right side of the dam). The concrete spillway and training walls were in good condition. Some flow of water was observed passing below the spillway and flowing out the spillway channel.

The spillway is not adequate to pass the 0.5 PMF test flood outflow without overtopping the dam. The test flood would overtop the dam by about 0.2 feet. The spillway would pass about 46 percent of the test flood outflow without overtopping the dam.

Within one year of receipt of the Phase I Inspection Report, the owner should retain the services of a qualified registered engineer to investigate the possibility of seepage along the toe of the dam and to determine what type of seepage control measures are required, if any. The possibility of movement

of the downstream slope of the dam should be investigated. In addition, underflow occurring at the spillway area should be investigated and required repairs initiated. The rip rap on the upstream face of the dam should be repaired.

The owner should carry out the following operational and maintenance procedures: 1) provide proper vegetation on the upstream and downstream slopes of the dam; 2) take such action as is necessary to prevent trespassing on the crest and slopes of the dam; 3) maintain the area within 25 feet downstream from the toe of the dam clear of trees and brush; 4) remove trees and brush from the downstream channel and at a distance of 20 feet on either side of the channel for a distance of 100 feet downstream of the dam; 5) develop a formal surveillance and flood warning plan, with an operational procedure to be followed in the event of an emergency; 6) institute procedures for an annual technical inspection of the dam and its appurtenant structures; and 7) outlet works capable of drawing down the reservoir should be maintained operational and in good repair.

S. Giavara, P.E.
President

Registered CT 7634

This Phase I Inspection Report on Plainville Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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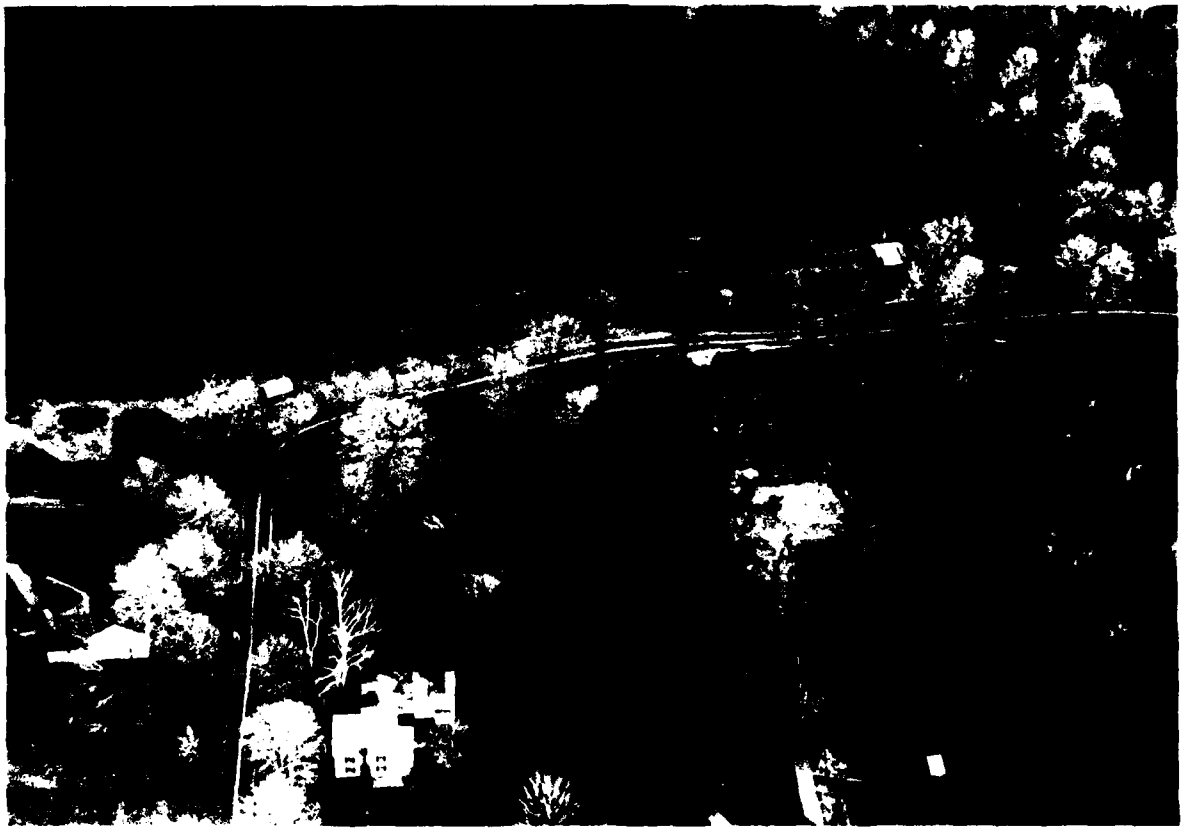
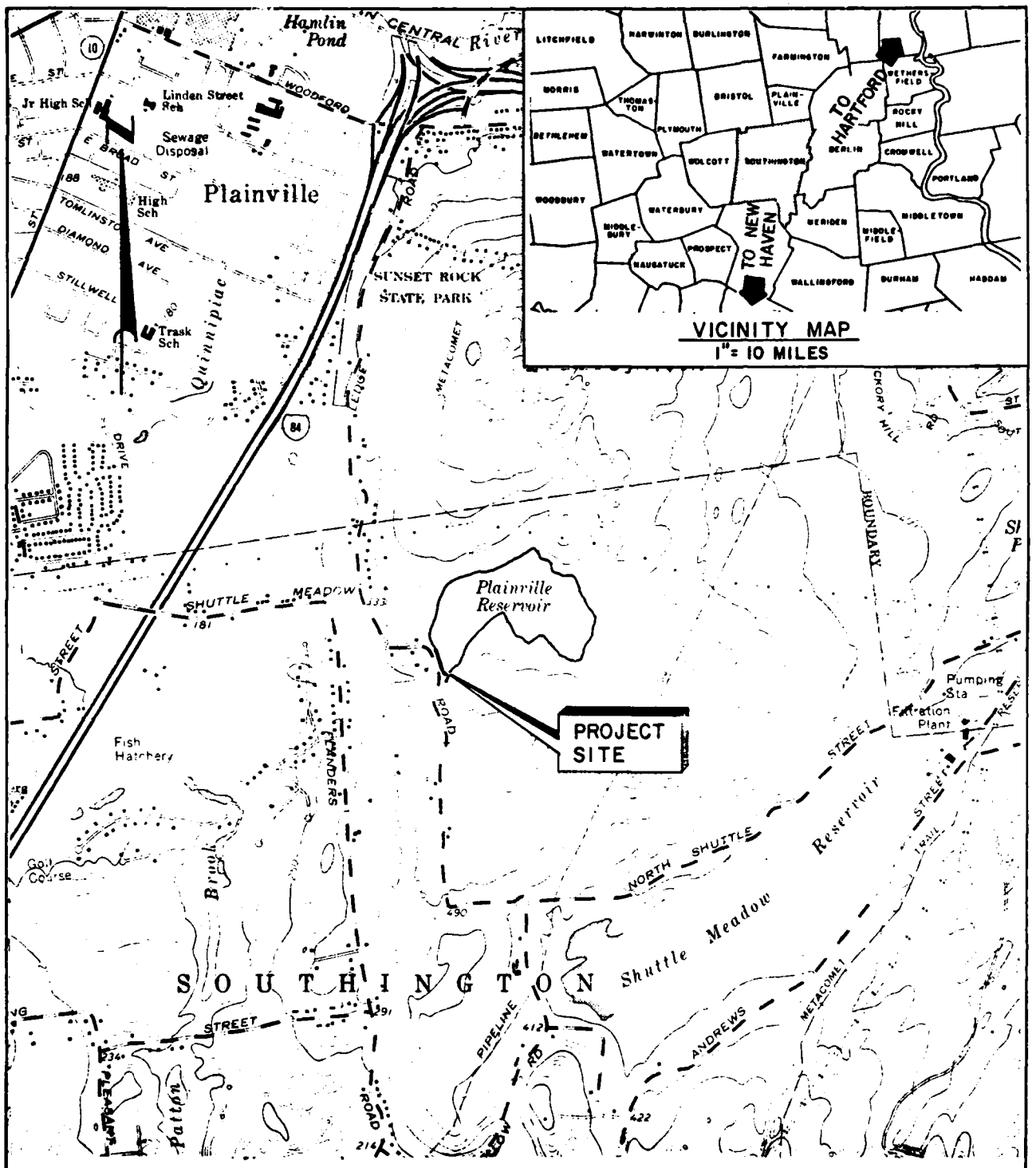
APPENDIXES



Overview Photo: Plainville Reservoir Dam




# PLAINVILLE RESERVOIR DAM

## LOCATION MAP

SOUTHINGTON, CONNECTICUT



FLAHERTY • GIAVARA ASSOCIATES, P.C.

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
PLAINVILLE RESERVOIR DAM - CT 00030

SECTION I - PROJECT INFORMATION

## 1.1 GENERAL:

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 19 October 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0001 has been assigned by the Corps of Engineers for this work.

b. Purpose.

1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2) Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.

3) To update, verify and complete the National Inventory of Dams.

## 1.2 DESCRIPTION OF THE PROJECT:

a. Location. Plainville Reservoir Dam is located in Southington, Connecticut on a tributary stream to the Quinnipiac River. The reservoir is located approximately 2 miles southeast of the center of Plainville. The reservoir is shown on U.S.G.S. Topographic Map "New Britain, Connecticut" at a latitude of 41° 38' 21" and a longitude of 72° 50' 36". The Location Map on page vi shows the location of the structure.

b. Description of Dam and Appurtenances. Plainville Reservoir Dam is an earthen embankment dam with a maximum height of 17 feet and a length of 688 feet. A concrete spillway section is located near the left (west) abutment of the dam. The dam embankment elevation is 427± feet. The upstream face of the earth embankment slopes at 1.5 horizontal to 1 vertical and protected with riprap underlain by select

material. The downstream face also slopes at 1.5 horizontal to 1 vertical. The construction plans indicate that this dam contains a center core "puddle wall."

The spillway consists of a concrete slab broad crested weir 15 feet wide. Concrete training walls are located on both sides of the spillway. The available construction plans indicate that the concrete spillway slab is underlain by a central "puddle wall" with earth material to either side. The downstream face of the spillway is a stone masonry wall.

The outlet works consist of a free standing stone and mortar intake tower in the reservoir. This intake tower feeds two gatehouses at the downstream toe of the dam which supply 8-inch and 12-inch diameter water supply mains (standby). There are two 6-inch diameter blow-offs located on each of these mains.

c. Size Classification. Plainville Reservoir has a storage volume of 528 acre-feet and a dam height of 17± feet. Storage of less than 1,000 acre-feet and a height of less than 40 feet classifies this structure in the "small" category according to guidelines established by the Corps of Engineers.

d. Hazard Classification. The dam is classified as having a "high" hazard potential. The areas of probable impact include single family residential properties along Flanders Road and Shuttle Meadow Road in the Town of Southington, Connecticut. The number of dwellings in the probable impact area is approximately 15. Interstate Highway 84 is located 4,000± feet downstream of the dam. It is anticipated that the highway embankment would provide an obstruction to the downstream movement of water.

e. Ownership. The Plainville Reservoir Dam was originally built for and is owned by the Plainville Water Company, 17 Pierce Street, Plainville, Connecticut. The current Superintendent of the company is Mr. Lou Bordeau, telephone: 203-747-2734.

f. Operator. The Plainville Water Company Superintendent, Mr. Lou Bordeau, operates this dam.

g. Purpose of Dam. The original purpose of the dam was to impound the reservoir for use as a public water supply. For the past several years the reservoir has not been utilized actively for water supply purposes. It functions as a standby reservoir.

h. Design and Construction History. The dam was constructed in 1884 and designed by the Connecticut Patent Water Pipe Company. The original design plans for this dam are included in Appendix B.

i. Normal Operation Procedures. The reservoir for the past several years has not been utilized actively for public water supply. As a result, the 8-inch and 12-inch water mains through the dam from the intake tower have not been utilized other than for routine maintenance purposes. In anticipation of heavy rains, the water mains are opened and water is discharged downstream below the dam via blow-off pipes. This procedure is practiced to minimize the reservoir's maximum water surface level during a storm event.

1.3 PERTINENT DATA:

a. Drainage Area. The drainage area consists of 0.37 square miles of rural land located on the western side of a prominent rocky ridge. The watershed is totally wooded with steep to moderate slopes. The length of the watershed is 3,000± feet with a width of 5,000± feet.

b. Discharge at Dam Site.

1) Two water mains (8-inch and 12-inch) pass through the dam to individual gatehouses. A 6-inch diameter blow-off pipe is located on each of these water mains and serve as a free discharge for the outlet works. The discharge capacity of the outlet works is unknown.

2) There are no known records of past floods or flood stage heights at the dam.

3) The ungated spillway capacity at the top of dam - 109 cfs @ El. 426.8.

4) The ungated spillway capacity at the test flood elevation - 123.5 cfs @ El. 427.0.

5) The gated spillway capacity at normal pool elevation is not applicable at this dam.

6) The gated spillway capacity at test flood elevation is not applicable at this dam.

7) The total spillway capacity at test flood elevation - 124 cfs @ El. 427.0.

8) The total project discharge at the top of dam - 109 cfs @ EL. 426.8.

9) The total project discharge at test flood elevation - 238 cfs @ El. 427.0.

c. Elevation (ft. above MSL).

| | | |
|---|---|---|
| 1) | Streambed at toe of dam | 409± |
| 2) | Bottom of cutoff | 405± |
| 3) | Maximum tailwater | N/A |
| 4) | Recreation pool | N/A |
| 5) | Full flood control pool | N/A |
| 6) | Spillway crest | 425± |
| 7) | Design surcharge | Unknown |
| 8) | Top of dam | 426.8± |
| 9) | Test flood design surcharge | 427.0 |

d. Reservoir (Length in feet).

| | | |
|---|---|---|
| 1) | Normal pool | 2,000± |
| 2) | Flood control pool | N/A |
| 3) | Spillway crest pool | 2,000± |
| 4) | Top of dam | 2,010± |
| 5) | Test flood pool | 2,010± |

e. Storage (acre-feet).

| | | |
|---|---|---|
| 1) | Normal pool | 429 |
| 2) | Flood control pool | N/A |
| 3) | Spillway crest pool | 429 |
| 4) | Top of dam | 528 |
| 5) | Test flood pool | 540 |

f. Reservoir Surface (acres).

| | | |
|---|---|---|
| 1) | Normal pool | 55 |
| 2) | Flood control pool | N/A |
| 3) | Spillway crest | 55 |
| 4) | Test flood pool | 55 |
| 5) | Top of dam | 55 |

g. Dam.

1) Type ..... Earth embankment with broad crested concrete spillway

2) Length ..... 688 feet

3) Height ..... 17 feet

4) Top Width ..... 10 feet

5) Side Slopes .... Upstream: 1.5 horizontal to 1 vertical
Downstream: 1.5 horizontal to 1 vertical

6) Zoning ..... Selected material under riprap face puddle wall core

7) Impervious Core ..... Puddle wall core

8) Cutoff ..... Puddle wall keyed into original ground

9) Grout curtain ..... None

h. Diversion and Regulating Tunnel.

1) Type ..... N/A

2) Length ..... N/A

3) Closure ..... N/A

4) Access ..... N/A

5) Regulating Facilities ..... N/A

i. Spillway.

1) Type ..... Broad crested concrete weir

2) Length of weir ..... 15 feet

3) Crest elevation ..... 425 feet

4) Gates ..... None

5) U/S Channel ..... Reservoir

6) D/S Channel ..... Rectangular concrete channel

j. Regulating Outlets.

| | | |
|---|---|---|
| 1) | Invert ..... | Unknown |
| 2) | Size ..... | 12" diameter and 8" diameter |
| 3) | Description ..... | Cast iron pipe |
| 4) | Control mechanism ..... | Manually operated gates |

## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN:

No engineering data has been found to provide any information about the design of Plainville Reservoir Dam.

### 2.2 CONSTRUCTION:

A plan showing sections through the center of spillway, gate chamber and embankment section prepared by Connecticut Patent Water Pipe Co. Hydraulic Engineers (all undated), is the only known construction information available. A topographic map of the site showing a plan view of the dam was provided by the owner. Information presented in this report was primarily obtained by interviews and direct measurements of the existing structures.

### 2.3 OPERATION:

Formal operation records are not available for this dam.

### 2.4 EVALUATION:

a. Availability. Only minimal engineering information is available for this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. The field investigation indicated that the external features of Plainville Reservoir Dam substantially agree with those on the available plans.

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS:

a. General. The initial Phase I visual examination of Plainville Reservoir Dam was conducted on 23 October 1979, with a follow-up inspection conducted on 15 November 1979.

In general, the dam was judged to be in fair condition. The vertical and horizontal alignment is good, however a slight dip in the crest was noted in the vicinity of the downstream gatehouse. Several windows were observed in the upstream riprap which ends about 2 feet below the crest of the dam. Some small seeps were observed near the downstream slope (right side of dam). The concrete spillway and training walls were in good condition. Some flow of water was observed passing below the spillway and flowing out the spillway channel. The deficiencies requiring correction have been noted.

A visual inspection checklist is included in Appendix A and selected photographs of the project are presented in Appendix C.

b. Dam. The dam is a 688-foot long earthen embankment with a spillway section at the left side of the dam. The embankment is comprised of two straight sections which intersect at approximately Station 3+0.

1) Upstream Face - The upstream face is mostly covered with thick vegetation as shown on Photo No. 1. Riprap extends approximately halfway up the slope from the water surface. In some locations the riprap is absent or has been displaced by erosion. At Station 1+0, the riprap is absent in a 10-ft.-wide zone as shown in Photo No. 14. Erosion and slumping is evident at several locations along the upstream face above the upper edge of the riprap. Vertical scarps up to 2 feet high on the upstream face of the dam were observed (see Photo No. 17).

2) Crest - The crest of the dam is covered with grass, and there is a worn footpath near the right end of the embankment (Photo Nos. 2, 3, 4, 5 and 6). The crest is rounded and slopes slightly toward both the upstream and downstream faces. Near Station 4+20 there appears to be a slump near the downstream edge of the crest which is approximately 4 feet wide and up to 1 foot in height. No longitudinal cracks were observed along the crest of the dam at the time of the inspection. An area of apparent slumping along the downstream crest in the vicinity of Station 4+0 is shown in Photo No. 15. The slump area is approximately 4 feet wide and 1 foot high.

3) Downstream Face - During the initial site visit on 23 October 1979, the downstream face was covered with an extensive growth of grass, trees, small saplings and brush which made it very difficult

traverse the slope (Photos No. 7, No. 9 and No. 13). The dam was again visited on November 15, 1979, at which time the majority of the vegetation on the downstream slope had been cut and removed, exposing the underlying surface (Photos No. 8 and No. 10). The downstream face has an average slope of 1.5H:1V. The screen well structure is located just downstream from the toe of the slope near Station 4+40. An eroded footpath has developed on the downstream slope adjacent to this structure. An erosion ditch has also formed just downstream from the structure which is approximately 1.5 feet deep in the vicinity of the catch basin.

Standing water was observed at several locations along the downstream slope. Photo No. 16 shows one of the areas in the vicinity of Station 2+65. Note that several rocks have been piled around this location.

c. Appurtenant Structures.

1) Spillway - The bottom slab of the broad crested spillway is in good condition (Photos No. 1 and No. 11). A 6-inch deep notch has been cut in the slab to concentrate low flows. The vertical downstream concrete face of the spillway is also in good condition. On 15 November 1979, water apparently was flowing beneath or around the spillway. The reservoir water level was below the spillway crest, however water was flowing in the spillway discharge channel.

The spillway has concrete (or concrete faced masonry) training walls on both sides of it to retain the earth embankment of the dam. The exposed surface of the training walls are in fair condition, with several areas of spalled concrete and hairline cracks. It appears that the walls have received some repair work as evidenced by concrete patching. The allowable head in the spillway is 1.8 feet. The height of the training walls decreases at the downstream end of the spillway. At high depths of flow, it may be possible for water in the spillway area to overtop the training wall and run down the earth embankment behind the walls.

2) Spillway Discharge Apron - The spillway discharges onto a nearly flat apron or bed of stone riprap as wide as the spillway. This apron serves as an impact and stilling area. The riprap was overgrown with weeds and small diameter brush which prevented observation of the entire channel bed. The sides of the apron area consist of stone masonry retaining walls, approximately 4 feet high. Some deterioration of the walls has occurred, and two short sections of wall have partially collapsed.

3) Spillway Discharge Channel - The open channel conveying water away from the spillway discharge apron is five feet wide and is constructed of stone masonry. It is generally in good condition, with no visible erosion or deterioration. Weeds and brush are also growing in its bed as shown in Photo No. 12.

4) Outlet Works - The abandoned gatehouses are shown in Photo No. 18. An 8-inch and 12-inch diameter outlet pipes were previously used as water supply mains and were not visible. The control valves were found at the toe of the dam in the vicinity of the gatehouses. There are two 6-inch blow-off pipes located adjacent to the water supply pipes, and these blow-offs are opened prior to major storm events to lower the reservoir water level.

d. Reservoir. The watershed is rural and totally wooded. The perimeter of the reservoir has mild to steep slopes, and appeared stable (Photo No. 19). There were no visible sediment deposits in the reservoir.

e. Downstream Channel. The downstream channel is a natural brook, which has a stable sand bed, with some light vegetation noted. The banks are stable, with no signs of erosion.

## 3.2 EVALUATION:

Based on the visual inspection, Plainville Reservoir Dam is in fair condition.

Trespassing has led to the development of a path along a portion of the crest of the dam and along a section of the downstream slope. There is an extensive growth of brush and vegetation on the upstream and downstream slope which requires periodic cutting to allow adequate inspection.

Several wet and spongy areas were observed in the vicinity of the downstream toe. Underflow beneath the spillway could lead to erosion and a possible stability problem.

## SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

### 4.1 OPERATIONAL PROCEDURES:

a. General. Plainville Reservoir has been used in the recent past as a water supply reservoir. However, at the present time, no water from the reservoir enters the water supply system. Two 6-inch diameter blow-off pipes are opened prior to major storm events to lower the water level in the reservoir.

b. Description of Any Warning System In Effect. There is no warning system in effect at this project.

### 4.2 MAINTENANCE PROCEDURES:

a. General. The crest of the dam is occasionally mowed and the downstream slope is cleared of brush on a periodic basis.

b. Operating Facilities. There are no formal maintenance procedures followed for the operating facilities.

### 4.3 EVALUATION:

Regular operational maintenance procedures for this dam and its appurtenances have not been developed or implemented.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

## SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

### 5.1 GENERAL:

The Plainville Reservoir Dam is a 688-foot long earth embankment with a maximum height of approximately 17 feet. The dam has a broad crested spillway made of concrete, with a width of 15 feet. The allowable head at the spillway is 1.8 feet, and the vertical drop at the end of the spillway is approximately 3.5 feet. Plainville Reservoir impounds a normal storage of about 430 acre-feet and about 530 acre-feet to the top of the dam. The spillway is capable of discharging about 110 cfs with surcharge to the top of the dam.

The watershed consists of 0.37 square miles of land, all rural, located on the western side of a prominent rocky ridge.

### 5.2 DESIGN DATA:

There is no known data available on the hydraulic design of the dam.

### 5.3 EXPERIENCE DATA:

No records are available in regard to past operation of the reservoir or of outlets. The only available information on the past performance is from an interview with a nearby resident who has lived in the area for over 25 years. This person reported that the maximum observed flow depth over the spillway was approximately 6 inches (20 cfs).

### 5.4 TEST FLOOD ANALYSIS:

The test flood for determining the spillway adequacy is based upon OCE guidelines. The size classification of the dam is "small," based upon a height of 17 feet and storage volume of 528 acre-feet. The hazard potential is "high," due to suburban land use downstream of the dam and the results of dam failure analysis. The spillway test flood in the Corps of Engineers guidelines for this size dam and hazard potential ranges from the 1/2 PMF to the PMF. The recommended spillway test flood is 1/2 PMF, due to the small height of the dam and degree of downstream development.

The magnitude of the spillway test flood was determined by using a hydrograph method developed by the U.S. Department of Agriculture, Soil Conservation Service, and described in the publication "Design of Small Dams," by the U.S. Bureau of Reclaimation.

The runoff rates were developed for storms with durations of one and six hours, to determine the most critical case.

The hydrographs were routed through the reservoir using a computer program based on stage-storage and stage-discharge data. The reservoir was assumed to be full and level with the spillway prior to the storm event.

The results of the routing indicate that the six-hour duration spillway test flood would have a peak reservoir stage at elevation 427.0 (0.2 ft. above the crest of the dam). The dam would be overtopped by the spillway test flood.

The spillway capacity (110 cfs) is equal to 46 percent of the test flood outflow rate (238 cfs).

## 5.5 DAM FAILURE ANALYSIS:

The downstream impact of a dam failure was analyzed using the COE "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs" dated April, 1978.

Based upon an assumed breach width equal to 40% of the dam's width at mid-height, the peak flood flow leaving the dam would be 32,400 cfs, with an initial depth of 13.3 downstream of the dam. The flood flow rate and flow depth diminish slowly as it initially moves downstream, due to a steep valley and the low storage volume. The width of the flood prone area then increases in the vicinity of Flanders Road, and the height of the flood wave decreases to about 6 feet.

The areas of probable impact include the single-family residential properties along Flanders Road, and Shuttle Meadow Road areas of the Town of Southington. The number of dwellings in the probable impact area is about 12.

Interstate Highway 84 crosses the path of the failure flood wave, and possibly could serve as an embankment impounding a portion of the flood flow. The depth of flooding at the low area east of the highway is estimated to be in the range of 10 feet, (4 houses). The other houses would generally be subjected to flooding of 4 feet or less.

## SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

### 6.1 VISUAL OBSERVATIONS:

The visual observation did not disclose any immediate stability problems. The vertical displacement resulting from erosion along the upstream face above the top of the riprap varies up to 6 inches in height. Some slumping and erosion of the downstream edge of the crest has occurred in the vicinity of Station 4+20. Some seepage may be occurring near the toe, especially in the vicinity of Station 2+60.

### 6.2 DESIGN AND CONSTRUCTION DATA:

No original design and construction data are available.

### 6.3 POST-CONSTRUCTION CHANGES:

No records of post-construction changes are available.

### 6.4 SEISMIC STABILITY:

Plainville Reservoir Dam is located in Seismic Zone 1 and in accordance with the recommended guidelines of the Corps of Engineers does not warrant seismic analysis.

## SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT:

a. Condition. The visual examination indicates that Plainville Reservoir Dam is in fair condition. The major concerns regarding the long-term performance of the dam are:

1) Existence of possible seepage areas along the downstream toe of the dam which are undetected due to the extensive vegetation in this area.

2) Existence of erosion on the upstream slope above the top of the riprap protection.

3) Underflow in the vicinity of the spillway, that could undermine the spillway and cause stability problems.

4) A number of operation and maintenance procedures should be followed as outlined in 7.3a, below.

The capacity of the spillway is inadequate to pass the 1/2 PMF test flood outflow of 238 cfs without overtopping the dam. The test flood would overtop the dam by 0.2 foot. The spillway is adequate to pass about 46 percent of the test flood without overtopping the dam.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based primarily on the results of the visual inspection, past performance history and sound engineering judgement.

c. Urgency. The recommendations made in 7.2 and 7.3 should be implemented by the owner within one year after receipt of this Phase I inspection report.

### 7.2 RECOMMENDATIONS:

a. It is recommended that the owner retain the services of a qualified registered engineer to perform the following:

1) Investigate the possibility of seepage along the toe of the dam and to determine what type of seepage control measures are required, if any.

2) Investigate the possibility of movement of the downstream slope of the dam.

3) Investigate the underflow occurring at the spillway and initiate required repairs.

4) Determine method of repair of the rip rap on the upstream face.

7.3 REMEDIAL MEASURES:

a. Operating and Maintenance Procedures.

1) The owner should provide proper vegetation on the upstream and downstream slopes of the dam.

2) The owner should take such action as is necessary to prevent trespassing on the crest and slopes of the dam.

3) The owner should maintain the area within 25 feet downstream from the toe of the dam clear of trees and brush.

4) Remove trees and brush from the downstream channel and at a distance of 20 feet on either side of the channel for a distance of 100 feet downstream of the dam.

5) Develop a formal surveillance and flood warning plan, with an operational procedure to be followed in the event of an emergency.

6) Institute procedures for an annual periodic technical inspection of the dam and its appurtenant structures.

7) Outlet works capable of drawing down the reservoir should be maintained operational and in good repair.

7.4 ALTERNATIVES:

There are no practical alternatives to the recommendations in Sections 7.2 and 7.3.

# APPENDIX A

## INSPECTION CHECK LIST

## INSPECTION CHECK LIST

## PARTY ORGANIZATION

PROJECT PLAINVILLE RESERVOIR DAM
Ledge Road
Plainville, Conn.

DATE Oct. 23, 1979

TIME 0930

WEATHER Overcast - 65°F

W.S. ELEV.____ U.S.____ DN.S.

PARTY:

1. R. Smith, FGA, Project Manager
2. J. MacBroom, FGA, Hydraulics/Hydrology
3. R. Murdock, GEI, Geotechnical
4. 
5. 

| | PROJECT FEATURE | INSPECTED BY | REMARKS |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| **DAM EMBANKMENT** | |
| Crest Elevation | |
| Current Pool Elevation | |
| Maximum Impoundment to Date | Unknown. |
| Surface Cracks | None observed. |
| Pavement Condition | Grass, good. |
| Movement or Settlement of Crest | Slight dip in d.s. direction just above d.s. gatehouse. |
| Lateral Movement | Good. |
| Vertical Alignment | Good. |
| Horizontal Alignment | Good. |
| Condition at Abutment and at Concrete Structures | Erosion in the vicinity of the spillway wing wall. |
| Indications of Movement of Structural Items on Slopes | None. |
| Trespassing on Slopes | Footpath in the vicinity of the d.s. gatehouse. |
| Sloughing or Erosion of Slopes or Abutments | None observed. |
| Rock Slope Protection - Riprap Failures | Many windows observed in the u.s. riprap; riprap ends ~2 ft below crest. |
| Unusual Movement or Cracking at or near Toes | None observed. |
| Unusual Embankment or Downstream Seepage | Small seepage observed near d.s. toe near Sta 2+65. |
| Piping or Boils | None observed. |
| Foundation Drainage Features | None. |
| Toe Drains | None. |
| Instrumentation System | None. |
| Vegetation | Extensive vegetation on u.s. and d.s. slopes. Re-inspected on 15 Nov. 1979 - brush cut and grass mowed. |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| DIKE EMBANKMENT | Not applicable. |
| Crest Elevation | |
| Current Pool Elevation | |
| Maximum Impoundment to Date | |
| Surface Cracks | |
| Pavement Condition | |
| Movement or Settlement of Crest | |
| Lateral Movement | |
| Vertical Alignment | |
| Horizontal Alignment | |
| Condition at Abutment and at Concrete Structures | |
| Indications of Movement of Structural Items on Slopes | |
| Trespassing on Slopes | |
| Sloughing or Erosion of Slopes or Abutments | |
| Rock Slope Protection - Riprap Failures | |
| Unusual Movement or Cracking at or near Toes | |
| Unusual Embankment or Downstream Seepage | |
| Piping or Boils | |
| Foundation Drainage Features | |
| Toe Drains | |
| Instrumentation System | |
| Vegetation | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE | |
| a. Approach Channel | |
| Slope Conditions | Underwater concrete apron 3 ft upstream from spillway location. |
| Bottom Conditions | |
| Rock Slides or Falls | |
| Log Boom | |
| Debris | |
| Condition of Concrete Lining | |
| Drains or Weep Holes | |
| b. Intake Structure | |
| Condition of Concrete | |
| Stop Logs and Slots | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - CONTROL TOWER | |
| a. Concrete and Structural | Wooden control tower, deteriorated, and some rotting noted. |
| General Condition | |
| Condition of Joints | |
| Spalling | |
| Visible Reinforcing | |
| Rusting or Staining of Concrete | |
| Any Seepage or Efflorescence | |
| Joint Alignment | |
| Unusual Seepage or Leaks in Gate Chamber | |
| Cracks | |
| Rusting or Corrosion of Steel | |
| b. Mechanical and Electrical | |
| Air Vents | |
| Float Wells | |
| Crane Hoist | |
| Elevator | |
| Hydraulic System | |
| Service Gates | Operated on frequent basis to lower water el. in reservoir. |
| Emergency Gates | |
| Lightning Protection System | |
| Emergency Power System | |
| Wiring and Lighting System in Gate Chamber | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - TRANSITION AND CONDUIT | Not applicable. |
| General Condition of Concrete | |
| Rust or Staining on Concrete | |
| Spalling | |
| Erosion or Cavitation | |
| Cracking | |
| Alignment of Monoliths | |
| Alignment of Joints | |
| Numbering of Monoliths | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL | Not applicable. |
| General Condition of Concrete | |
| Rust or Staining | |
| Spalling | |
| Erosion or Cavitation | |
| Visible Reinforcing | |
| Any Seepage or Efflorescence | |
| Condition at Joints | |
| Drain Holes | |
| Channel | |
| Loose Rock or Trees Overhanging Channel | |
| Condition of Discharge Channel | |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS | |
| a. Approach Channel | |
| General Condition | Underwater. |
| Loose Rock Overhanging Channel | |
| Trees Overhanging Channel | |
| Floor of Approach Channel | |
| b. Weir and Training Walls | |
| General Condition of Concrete | Generally in good condition. |
| Rust or Staining | None. |
| Spalling | Minor spalling. |
| Any Visible Reinforcing | None. |
| Any Seepage or Efflorescence | None. |
| Drain Holes | None observed. |
| c. Discharge Channel | |
| General Condition | Fair, ~ 5 ft of wall collapsed below spillway weir along right side. |
| Loose Rock Overhanging Channel | None. |
| Trees Overhanging Channel | None. |
| Floor of Channel | Natural stone and gravel bottom. |
| Other Obstructions | None. |

# PERIODIC INSPECTION CHECK LIST
# NATIONAL DAM INSPECTION PROGRAM

DAM: Plainville Reservoir Dam DATE: Oct. 23, 1979

| AREA EVALUATED | CONDITIONS |
|---|---|
| OUTLET WORKS - SERVICE BRIDGE | None. |
| a. Superstructure | |
| Bearings | |
| Anchor Bolts | |
| Bridge Seat | |
| Longitudinal Members | |
| Under Side of Deck | |
| Secondary Bracing | |
| Deck | |
| Drainage System | |
| Railings | |
| Expansion Joints | |
| Paint | |
| b. Abutment & Piers | |
| General Condition of Concrete | |
| Alignment of Abutment | |
| Approach to Bridge | |
| Condition of Seat and Backwall | |

# APPENDIX B

## ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM PLAINVILLE RES. DAM

I.D. NO. CT-00259

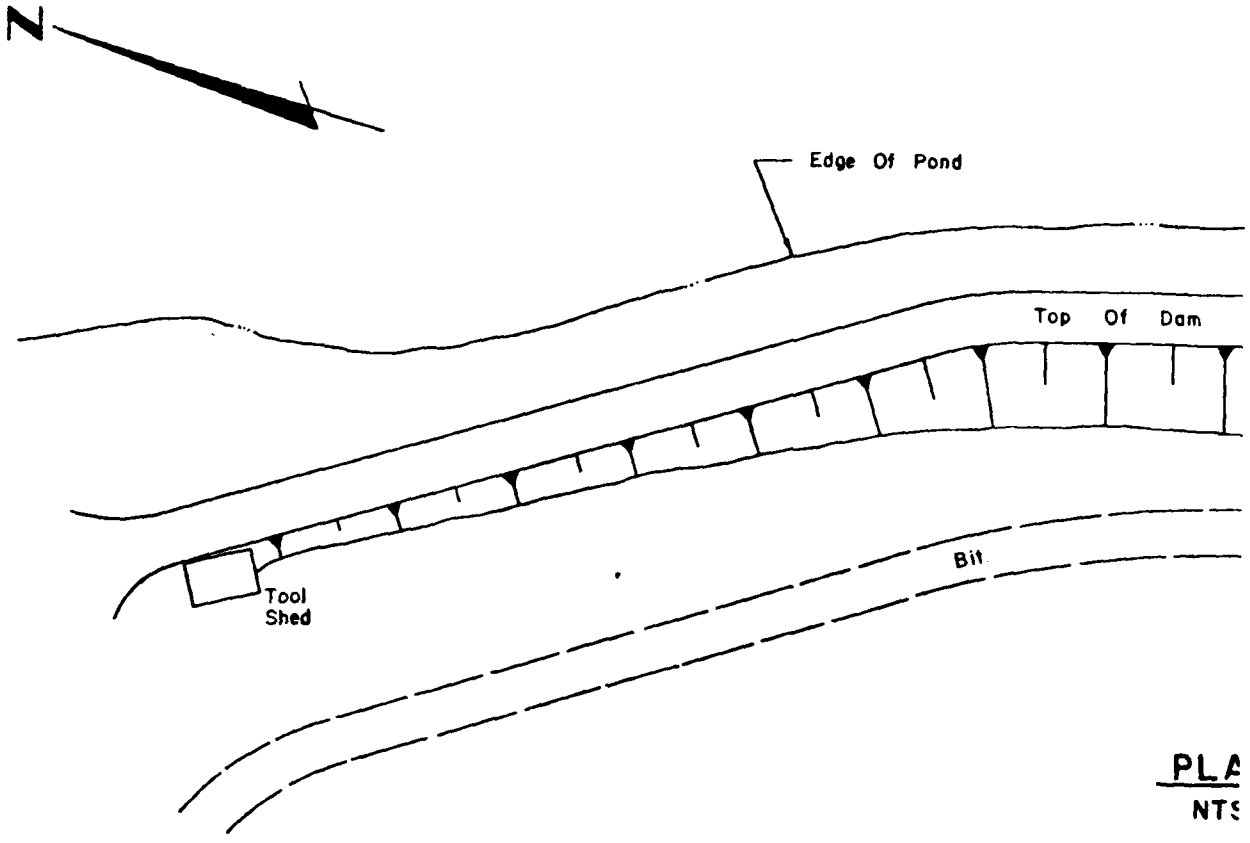
| ITEM | REMARKS |
|---|---|
| AS-BUILT DRAWINGS | TOPO MAP OF DAM SITE |
| REGIONAL VICINITY MAP | AVAILABLE FROM U.S.G.S. |
| CONSTRUCTION HISTORY | NONE AVAILABLE |
| TYPICAL SECTIONS OF DAM | FROM PLANS |
| OUTLETS - Plan | FROM PLANS |
| - Details | FROM PLANS |
| - Constraints | UNKNOWN |
| - Discharge Ratings | UNAVAILABLE |
| RAINFALL/RESERVOIR RECORDS | UNAVAILABLE |
| DESIGN REPORTS | NONE |
| GEOLOGY REPORTS | NONE |
| DESIGN COMPUTATIONS | |
| HYDROLOGY & HYDRAULICS | NONE |
| DAM STABILITY | NONE |
| SEEPAGE STUDIES | NONE |
| MATERIALS INVESTIGATIONS | |
| BORINGS RECORDS | NONE |
| LABORATORY | NONE |
| FIELD | NONE |

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

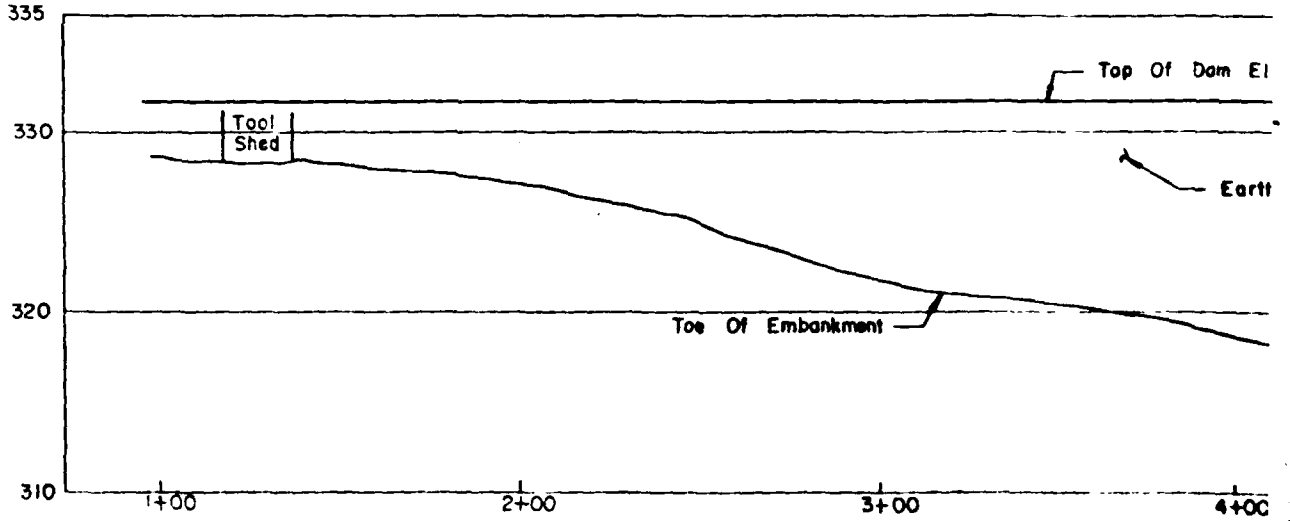
NAME OF DAM PLAINVILLE RES. DAM

I.D. NO. CT-00259

| ITEM | REMARKS |
|---|---|
| POST-CONSTRUCTION SURVEYS OF DAM | TOPO MAP OF DAM SITE |
| BORROW SOURCES | UNKNOWN |
| MONITORING SYSTEMS | NONE |
| MODIFICATIONS | UNKNOWN |
| HIGH POOL RECORDS | NONE - EXCEPT EYE WITNESS REPORT |
| POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS | NONE |
| PRIOR ACCIDENTS OR FAILURE OF DAM | NONE |
| DESCRIPTION | NONE |
| REPORTS | NONE |
| MAINTENANCE OPERATION RECORDS | NONE |
| SPILLWAY PLAN | |
| SECTIONS | FROM PLANS |
| DETAILS | FROM PLANS |
| OPERATING EQUIPMENT PLANS & DETAILS | FROM PLANS |

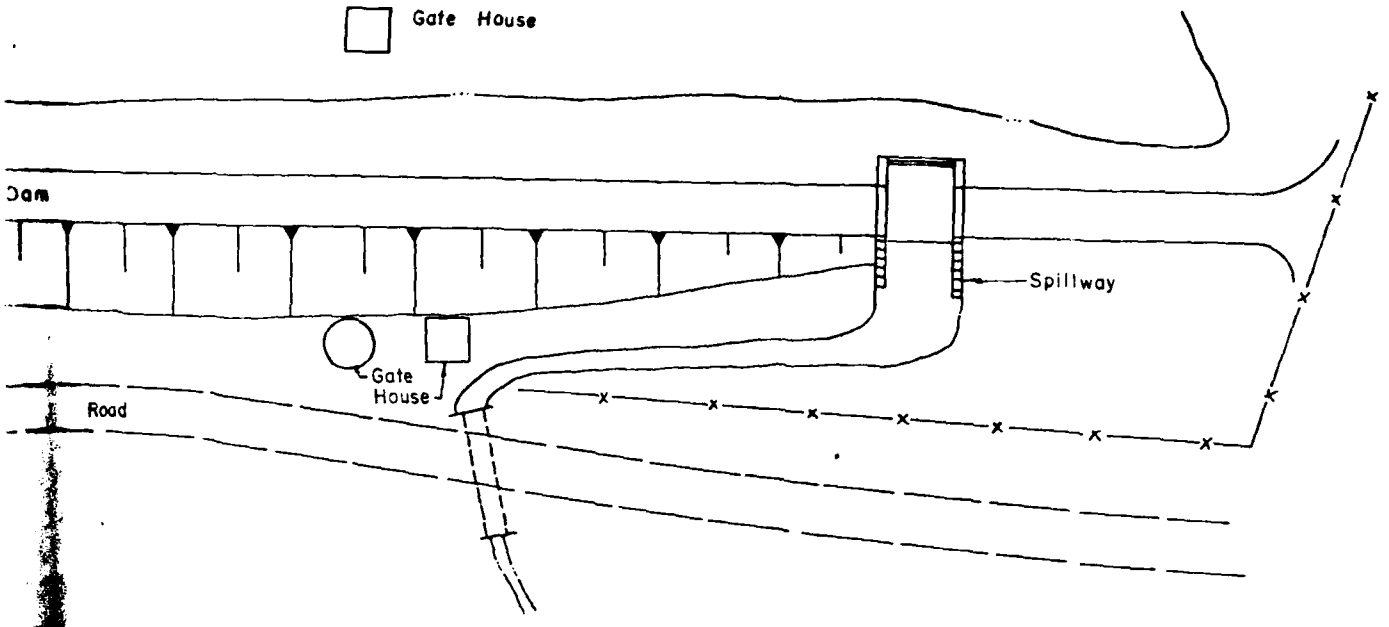



PLA
NTS

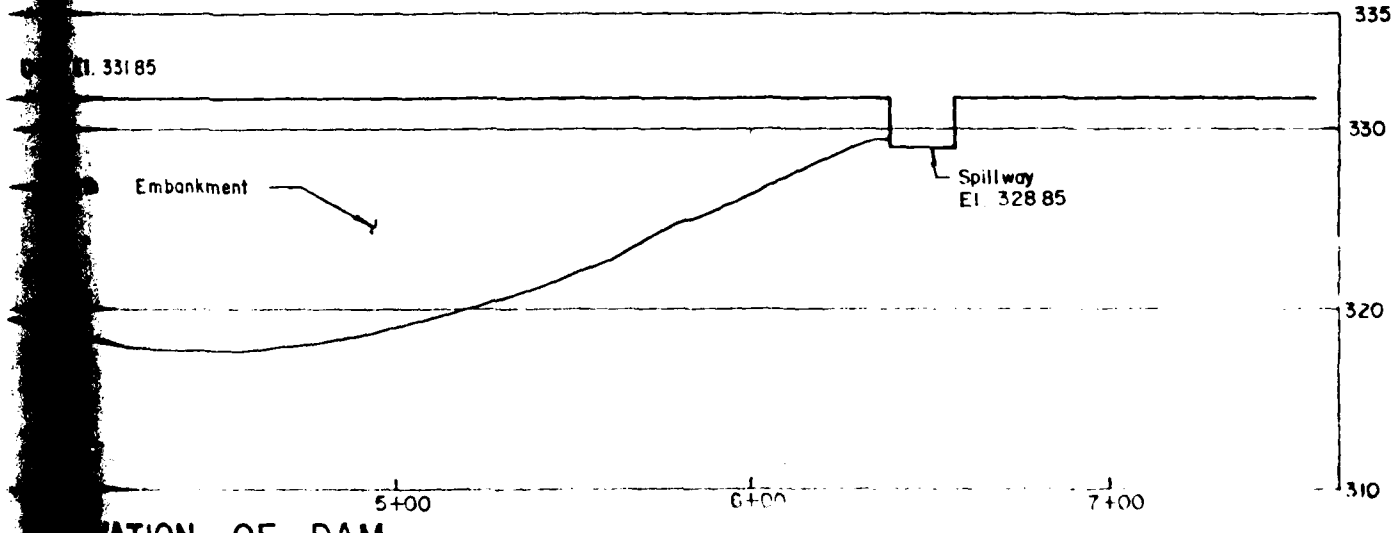



DOWNSTREAM ELE\
NTS

ADD 9497 TO THESE
ELEV. FOR U.S.C & G.S



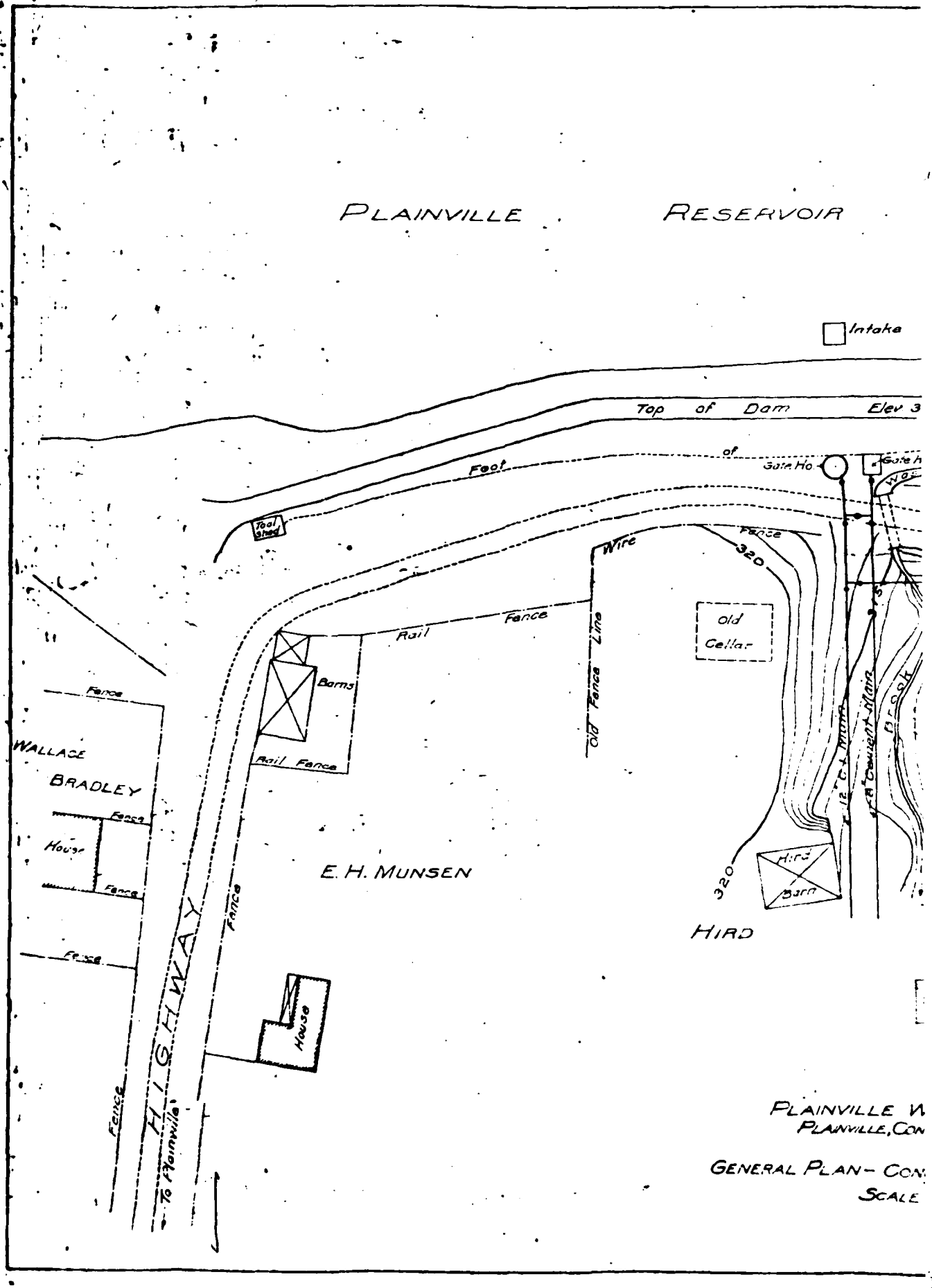

AN
TS



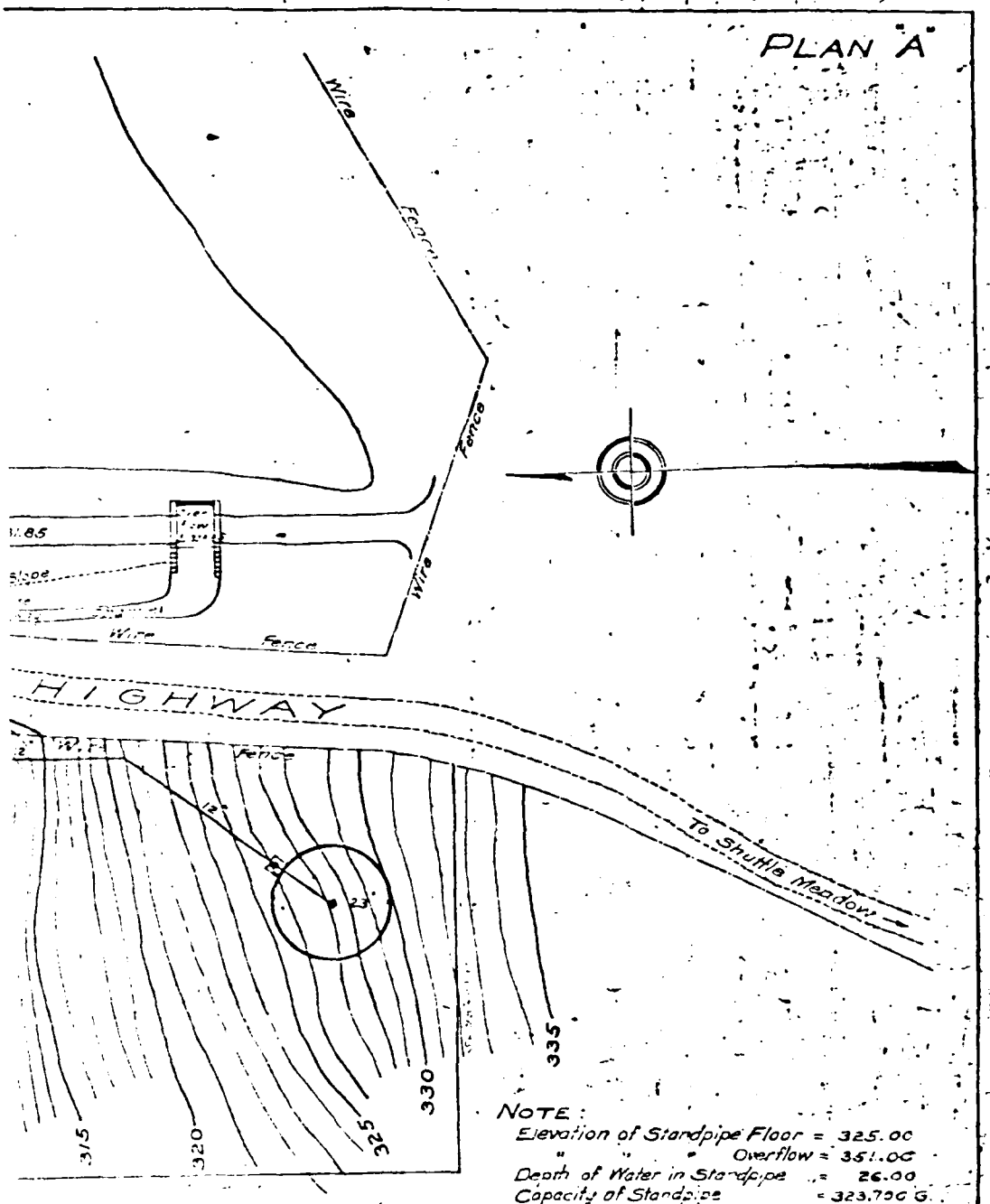

ATION OF DAM

# PLAINVILLE RESERVOIR DAM

3


PLAINVILLE RESERVOIR
Intake
Top of Dam Elev 3
Foot
of
Gate Ho
Gate h
W.O.
Tool shed
Wire
Fence
320
Old Cellar
Rail Fence
Barns
Rail Fence
Fence
Fence
Fence
WALLACE BRADLEY
Fence
House
Fence
Fence
E. H. MUNSEN
HIGHWAY
Fence
Fence
To Plainville
House
320
Hird Barn
HIRD
PLAINVILLE W
PLAINVILLE, CON
GENERAL PLAN - CON
SCALE

# PLAN A




NOTE:
Elevation of Standpipe Floor = 325.00
" " " Overflow = 351.00
Depth of Water in Standpipe = 26.00
Capacity of Standpipe = 323,750 G.

PROPERTY

ADD 94.37 TO
THESE ELEVATIONS
FOR USC & GS.

ATER COMPANY
APRIL 1912

ETE-STEEL STANDPIPE".
-1"=40'

2

REDUCED NOT TO SCALE

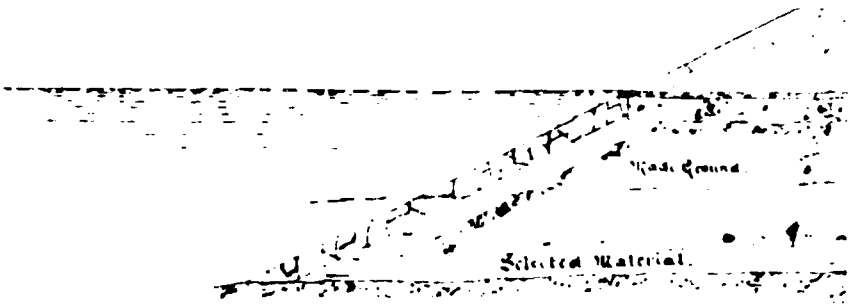
Joseph P. McKernan
Engineer & Superintendent

Plainville H

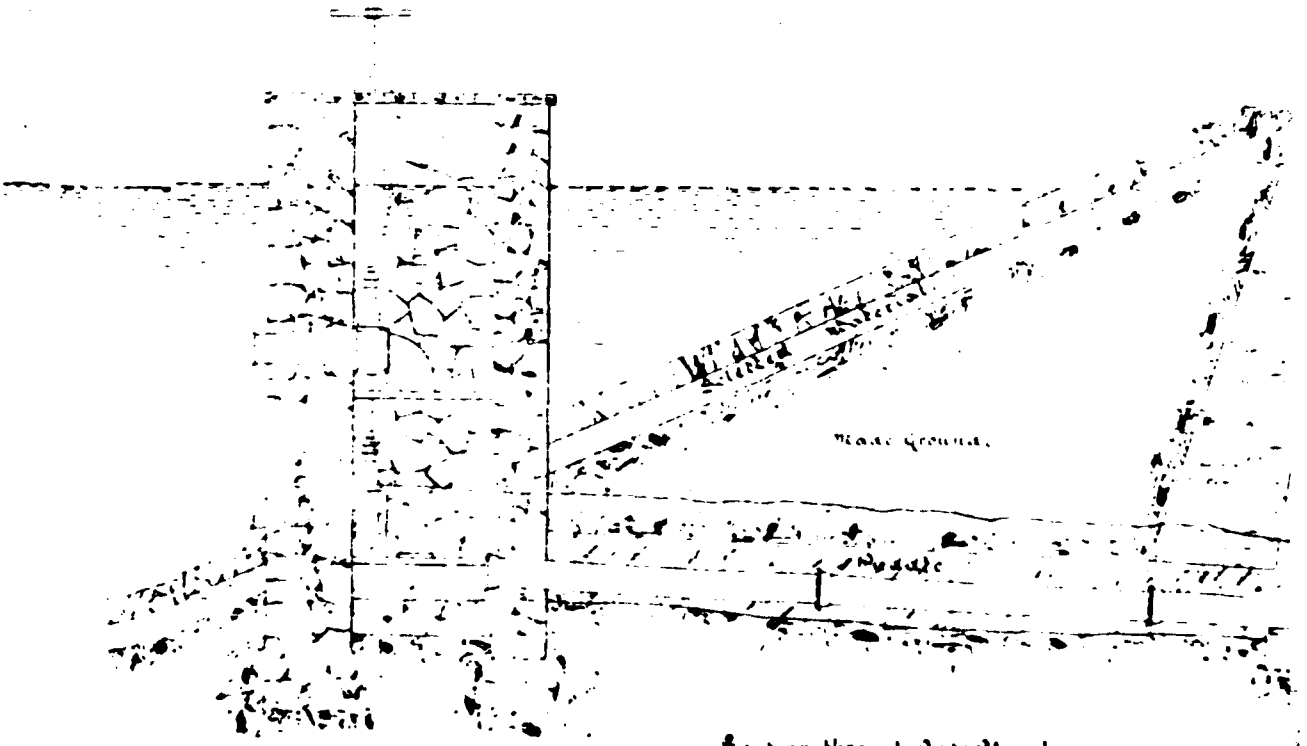
Dam Proj

Connecticut Gate

Hydraul




Section through center of Overflow.




Section through Gate Chamber.

ıter Supply.

ed by

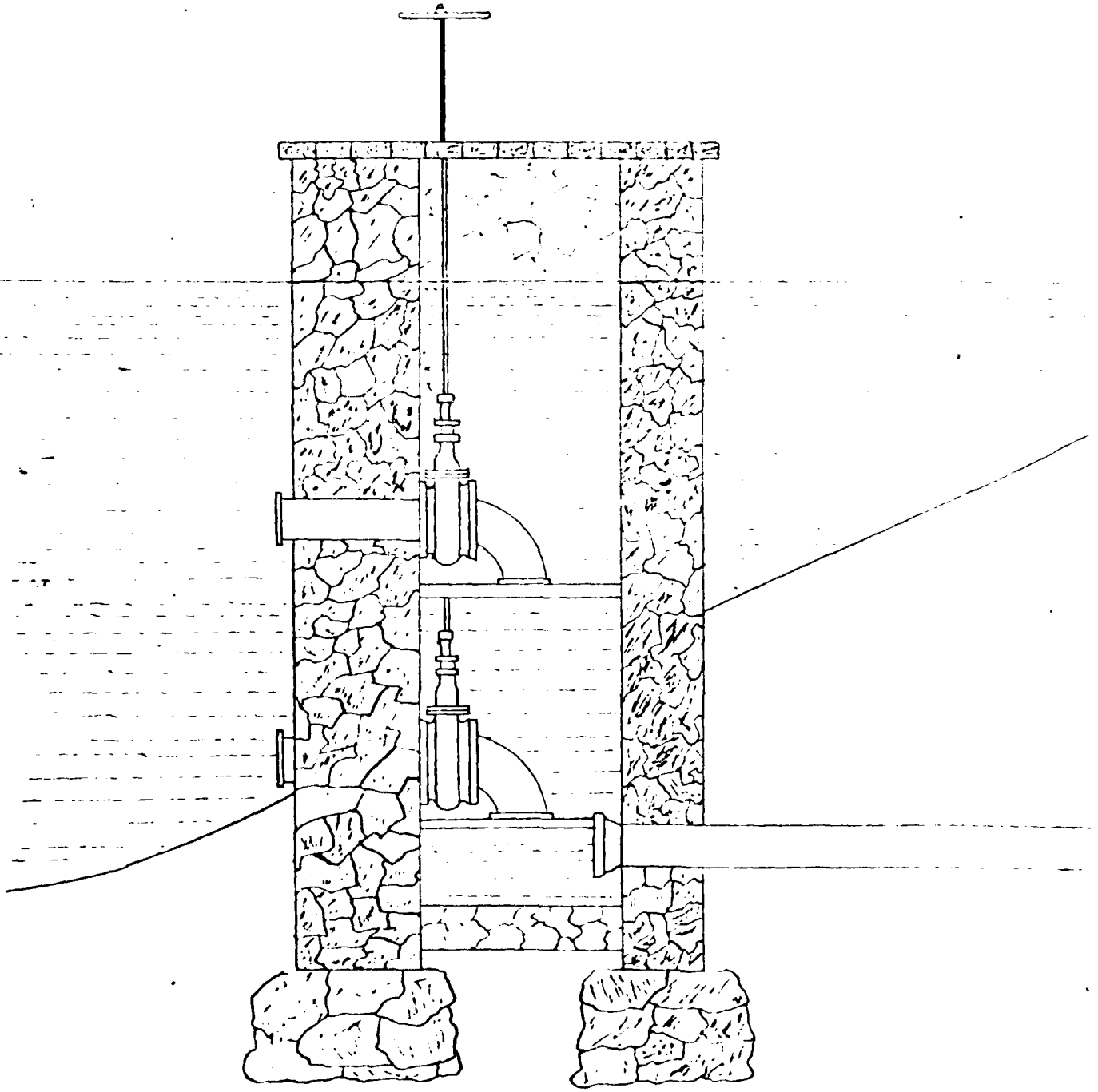
Water Pipe Co.

Engineers.

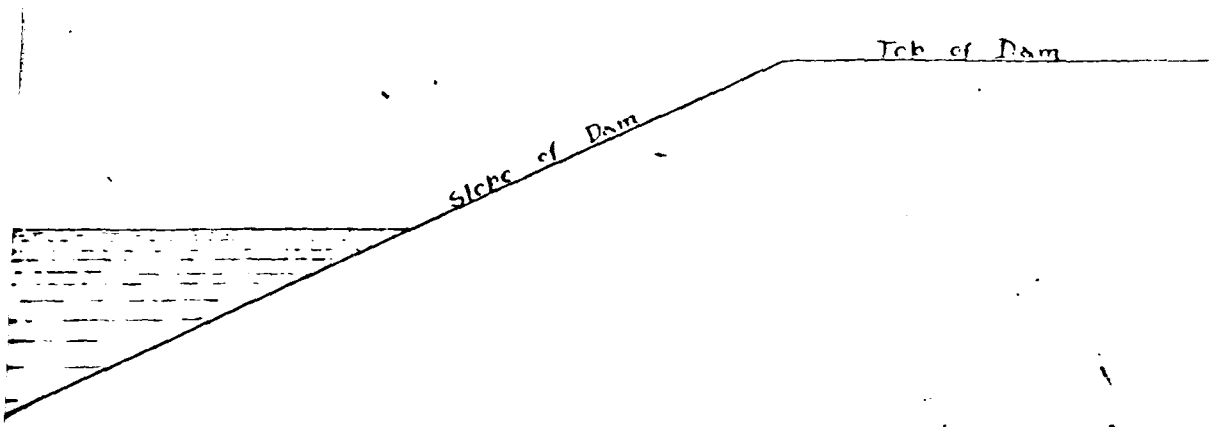

Scale 1 ft. to one inch


2

REDUCED NOT TO SCALE



Section through Gate Chamber




12" C I Main

2

REDUCED - NOT TO SCALE

# APPENDIX C

## PHOTOGRAPHS

PHOTO #1: Upstream face of dam from left (South) side.

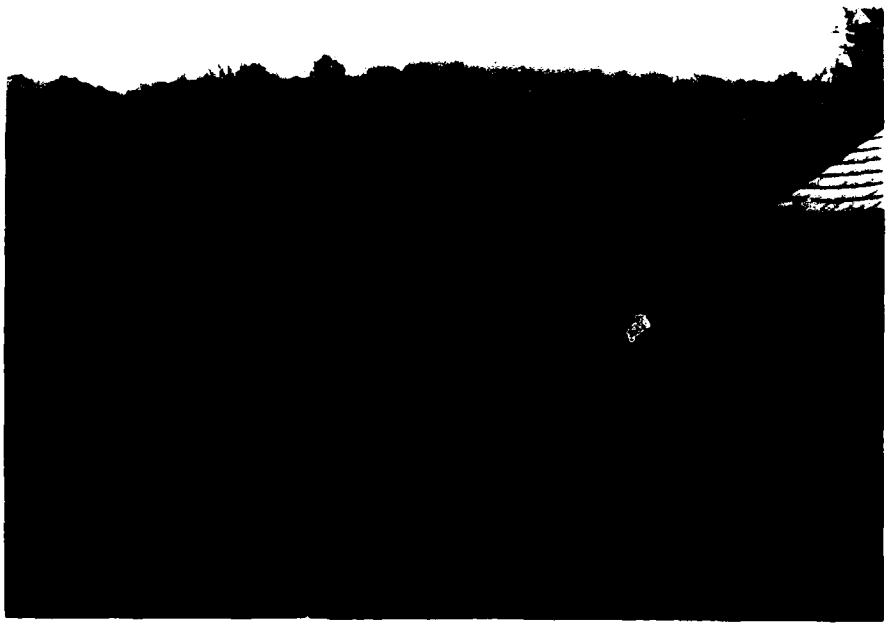


PHOTO #2: Crest of dam from right abutment.

PHOTO #3: Crest of dam looking toward spillway (from Sta. 4+0).

PHOTO #4: Crest of dam looking toward right (North) side (from Sta. 4+0).

PHOTO #5: Crest of dam looking toward spillway. Note intake structure.

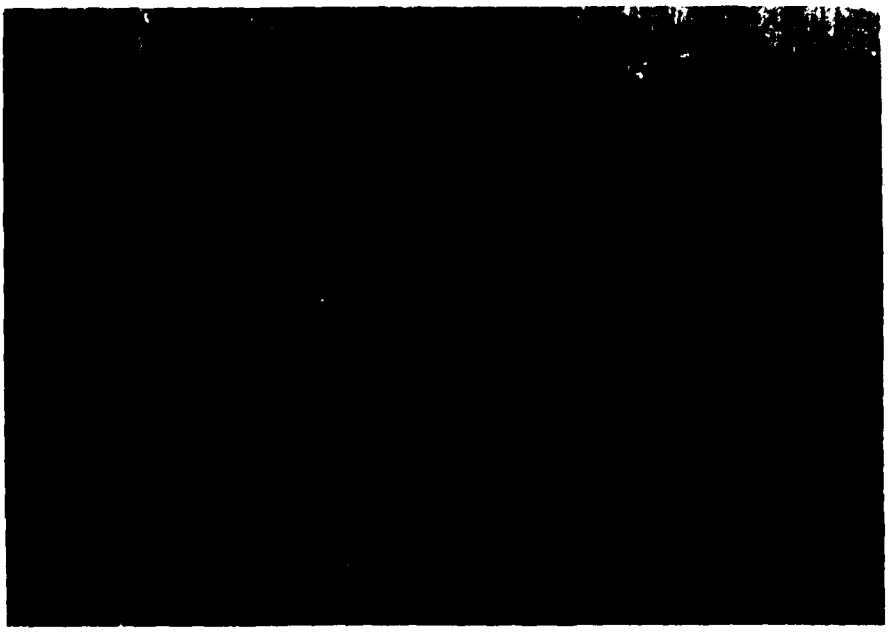


PHOTO #6: Left abutment looking along the dam crest.

PHOTO #7: Downstream slope of dam looking toward right (north).

PHOTO #8: Downstream slope of dam looking toward right (North). (Nov. 15, 1979)

PHOTO #9: Downstream slope of dam looking toward left abutment.

PHOTO #10: Downstream slope of dam looking toward left abutment. (Nov. 15, 1979)

PHOTO #11: Spillway.

PHOTO #12: Spillway channel looking downstream from a location near the left spillway channel wall.

PHOTO #13: Downstream slope looking toward right (North).

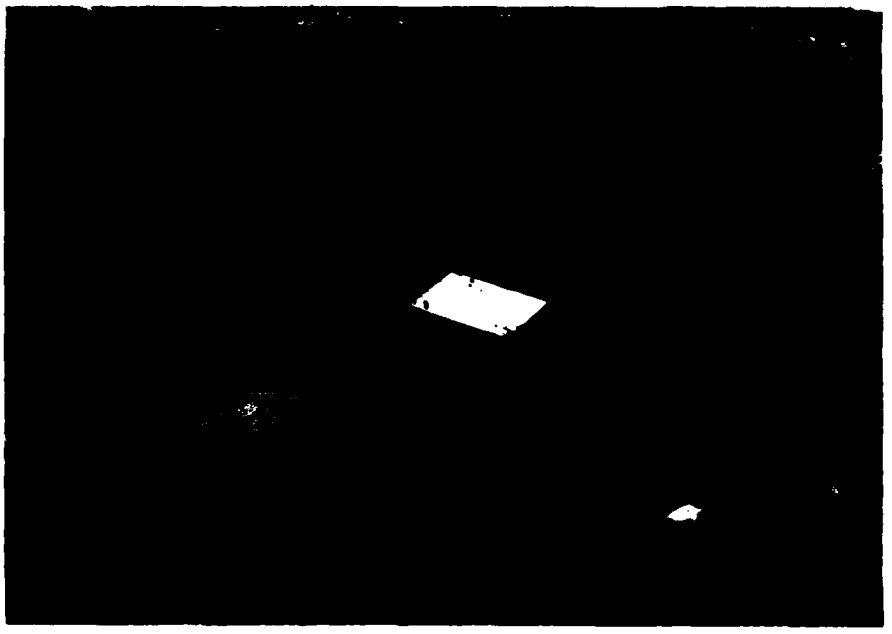


PHOTO #14: Erosion along upstream face of dam near Sta. 1+0; riprap is missing in this area.

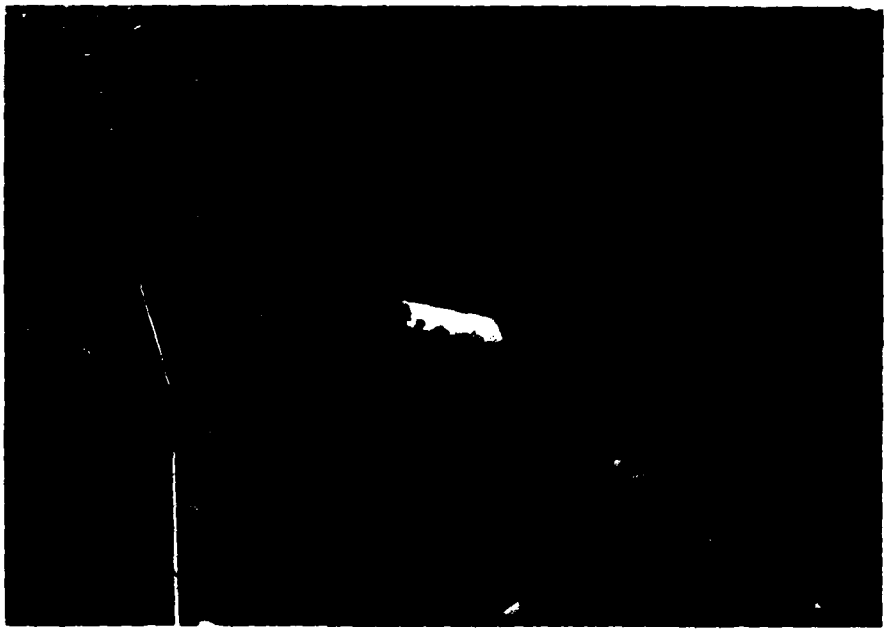


PHOTO #15: Area of apparent slumping along the downstream crest of the dam in the vicinity of Sta. 4+0. Slump area is approximately 4 ft. wide and 1 ft. high.

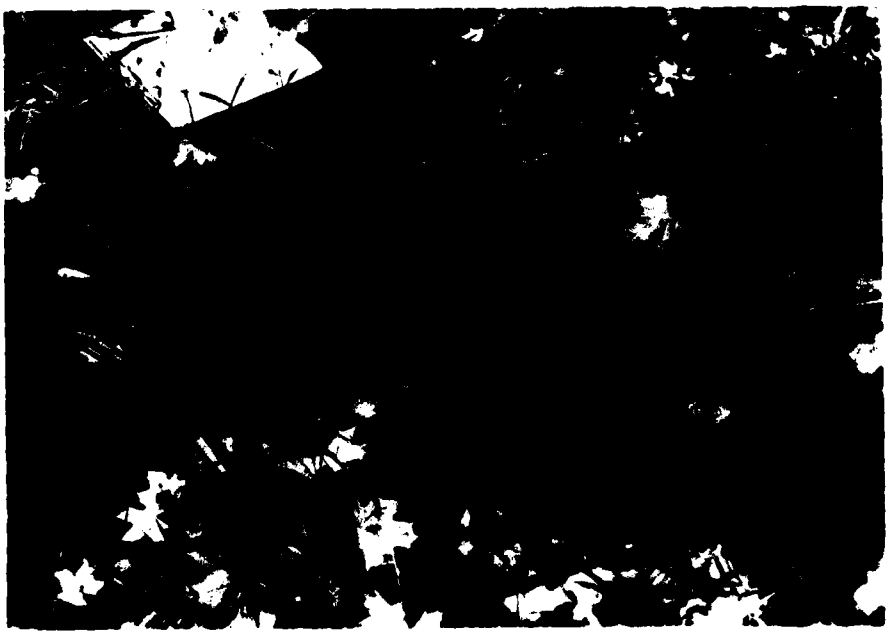


PHOTO #16: Close up of wet area near toe of downstream slope (Sta. 2+50).

PHOTO #17: Vertical scarp up to 2 ft. high on the upstream face of the dam.

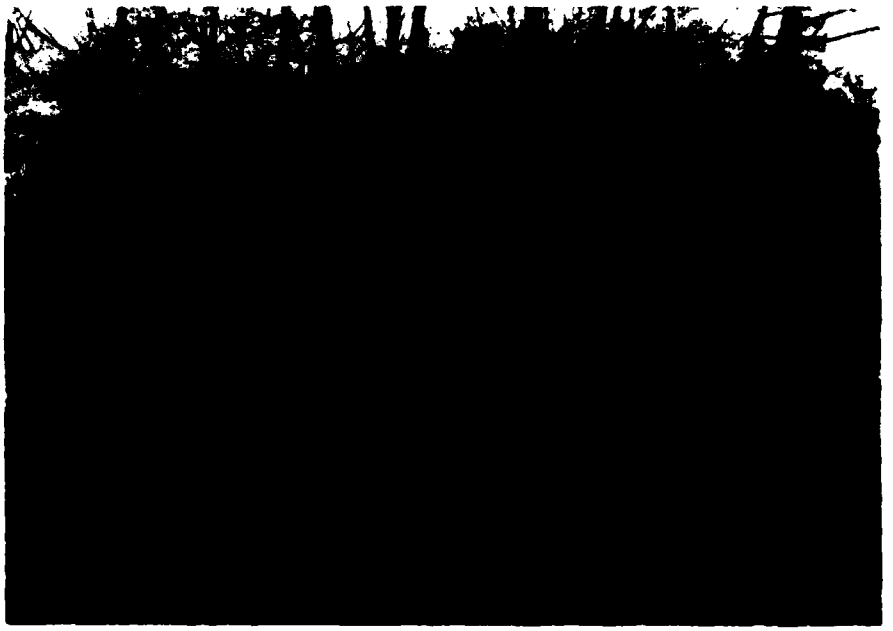
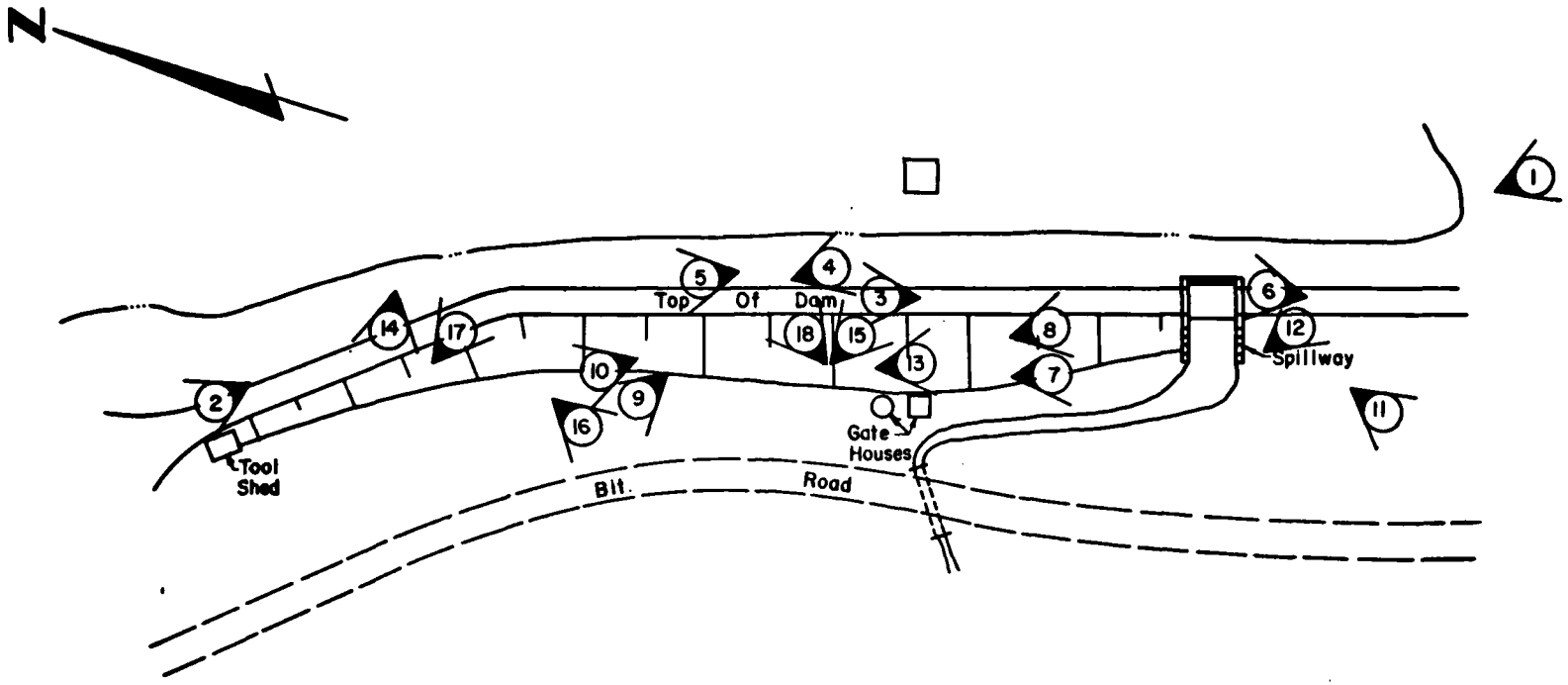


PHOTO #18: Abandoned gate houses downstream of dam.

PHOTO #19: [illegible] Area.




**LEGEND**

(5) Number refers to caption. Arrow indicates direction of photograph.

PLAINVILLE RESERVOIR DAM

## PHOTO LOCATION MAP

PROJECT
PLAINVILLE RES DAM
SOUTHINGTON, CT

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 1 OF 18
BY JGM DATE 12/14/79
CHK'D. BY PB DATE 12/20/79

# DETERMINATION OF SPILLWAY TEST FLOOD*

## A. SIZE CLASSIFICATION

Storage Volume (Ac.-Ft.) 528

Height of Dam (Ft.) 17

Size Classification SMALL

## B. HAZARD POTENTIAL CLASSIFICATION

| Category | Loss of Life | Economic Loss |
|---|---|---|
| Low | None expected | Minimal |
| Significant | Few | Appreciable |
| (High) | (More than few) | Excessive |

Hazard Classification HIGH

## C. HYDROLOGIC EVALUATION GUIDELINES

| Hazard | Size | Spillway Design Flood |
|---|---|---|
| Low | Small | 50 to 100-Year Frequency |
| | Intermediate | 100-Year Frequency to 1/2 PMF |
| | Large | 1/2 PMF to PMF |
| Significant | Small | 100-Year Frequency to 1/2 PMF |
| | Intermediate | 1/2 PMF to PMF |
| | Large | PMF |
| (High) | (Small) | (1/2 PMF to PMF) |
| | Intermediate | PMF |
| | Large | PMF |

Spillway Test Flood 1/2 PMF

*Based upon "Recommended Guidelines for Safety Inspection of Dams" Department of the Army, Office of the Chief of Engineers, November 1976.

## SPILLWAY TEST FLOOD

DUE TO THE SMALL WATERSHED DRAINAGE AREA OF 0.37 SQUARE MILES, THE PMF (AND HENCE THE 1/2 PMF TEST FLOOD) WILL BE DETERMINED BY AN EMPIRICAL METHOD DEVELOPED BY THE U.S. SOIL CONSERVATION SERVICE, AS DESCIBED IN THE BOOK "DESIGN OF SMALL DAMS".

STORM DURATIONS OF 1 HOUR AND 6 HOURS WILL BE TRIED TO IDENTIFY THE MORE CRITICAL CONDITION.

## RAINFALL

6 HOUR PMP = 24 INCHES
AREA-FIT REDUCTION FACTOR = 20% (PP 48)

EFFECTIVE 6HOUR PMP = 0.8(24.0) = 19.2 INCHES

## RUNOFF

WATERSHED IS GLACIAL TILL, SAY "CN" = 80
FOR A PARTIALLY SATUATED SOIL
FROM FIG A-4, RUNOFF = 16.5 INCHES

## TIME FACTOR

$$T_c = \left[\frac{11.9\,L^3}{H}\right]^{0.385}$$

L = 3200'/5280'/mile = 0.606 miles
H = 600 - 422 = 178'

$T_c = [11.9\,(0.606)^3/178]^{0.385} = 0.2$ HOURS
DUE TO ROUGH POORLY DEFINED CHANNEL, INCREASE $T_c$ BY 50% TO 0.3 HOURS

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## TIME TO PEAK

$$T_p = \frac{D}{2} + 0.6T_c = \frac{6}{2} + 0.6(0.3) = 3.18$$

## PEAK FLOW

$$Q = \frac{484\ A\ R}{T_p} = \frac{484(0.37)(16.5)}{3.18} = 929\ CFS$$

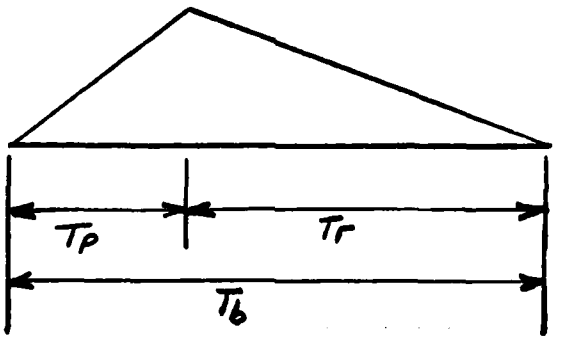
FOR 1/2 PMF SPILLWAY TEST FLOOD,

$$Q_p = 1/2\ Q = 1/2(929) = 464\ CFS$$

## VOLUME OF RUNOFF

$$V = 0.37\ mi^2(640\ AC) \times 8.25''/12 = 162.8\ AC\text{-}FT$$

## TRIANGULAR HYDROGRAPH




$T_p = 3.18$, SAY 3.2
$T_b = 2.67\ T_p$
$= 2.67(3.2) = 8.5$ HRS

PROJECT PRINVILLE RES DAM

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SHEET NO. 4 OF 18
BY JGM DATE 12/15/79
CHK'D. BY PB DATE 12/20/79

## HYDROGRAPH FOR 6 HR RAIN

| STORM HOUR | PEAK FLOW. CFS |
|---|---|
| 0 | 0 |
| 1 | 145 |
| 2 | 290 |
| 3 | 435 |
| 3.2 | 464 |
| 4.0 | 394 |
| 5.0 | 306 |
| 6.0 | 219 |
| 7.0 | 131 |
| 8.0 | 44 |
| 8.5 | 0 |

## 1 HR DURATION HYDROGRAPH

1 HR RAINFALL ≈ 50 % 6 HR RAINFALL

RAINFALL = 0.5(19.2) = 9.6 INCHES

RUNOFF = 7.1 INCHES (FIG A-4)

$T_p = 1/2 + 0.6(0.3) = 0.68$ HOURS

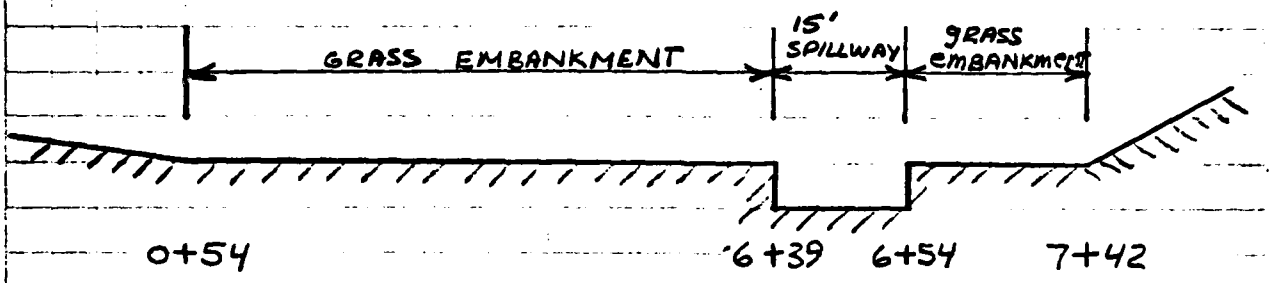
$$Q = \frac{484 \times 0.37 \times 7.1}{0.68} = 1870 \text{ CFS (PMF)}$$

TEST FLOOD = 1/2 (1870) = 935 CFS

$T_b = 2.67 (T_p) = 2.67(0.68) = 1.8$ HOURS

| TIME HOURS | PEAK FLOW, CFS |
|---|---|
| 0 | 0 |
| .2 | 275 |
| .4 | 552 |
| .6 | 825 |
| .68 | 935 |
| .80 | 835 |
| 1.0 | 667 |
| 1.2 | 500 |
| 1.4 | 334 |
| 1.6 | 167 |
| 1.8 | 0 |

# SPILLWAY




| SEGMENT | ITEM | "C" | LENGTH | ELEV. |
|---|---|---|---|---|
| 1 | GRASS EMBANK. | 2.5 | 585 | 426.8 |
| 2 | BROAD CREST CONC. SPILLWAY | 3.0 | 15 | 425.0 |
| 3 | GRASS EMBANK | 2.5 | 88 | 426.8 |

## STAGE-DISCHARGE DATA

$Q = C\ L\ H^{3/2}$ FOR EACH SEGMENT

| STAGE ELEV | SEGMENT 1 & 3 DISCHARGE, CFS | SEGMENT 2 DISCHARGE, CFS | TOTAL DISCHARGE |
|---|---|---|---|
| 425.0 | 0 | 0 | 0 |
| 425.5 | 0 | 15.9 | 15.9 |
| 426.0 | 0 | 45.0 | 45.0 |
| 426.5 | 0 | 82.7 | 82.7 |
| 426.8 | 0 | 108.7 | 108.7 |
| 427.0 | 150.5 | 127.3 | 277.8 |
| 427.5 | 985.4 | 177.9 | 1163.3 |

PLAINVILLE DAM 6 HR RAIN FLOOD ROUTING JGM 12/14/79

INPUT DATA: UNSUBMERGED WEIR
SEGMENT 1 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 585 ELEVATION OF WEIR = 426.8
SEGMENT 2 DISCHARGE COEFFICIENT = 3 LENGTH OF WEIR = 15 ELEVATION OF WEIR = 425
SEGMENT 3 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 88 ELEVATION OF WEIR = 426.8
IE=425.0 IV= 0.0 E=425.0 A= 55.00 E=430.0 A= 55.00 E=440.0 A= 55.00

| HOUR | INFLOW | MASS INFLOW | WATER EL. | TAIL WATER | OUTFLOW | MASS OUTFLOW | STORAGE(R) | STORAGE(A) |
|---|---|---|---|---|---|---|---|---|
| 0.00 | 0CFS | 0.00AC-F | 425.00FT | .00FT | 0CFS | 0.00AC-F | 0.00AC-F | 0.00AC-F |
| 1.00 | 145CFS | 5.99AC-F | 425.10FT | 0.00FT | 1CFS | 0.06AC-F | 5.92AC-F | 5.92AC-F |
| 2.00 | 290CFS | 23.96AC-F | 425.42FT | 0.00FT | 12CFS | 0.64AC-F | 23.32AC-F | 23.32AC-F |
| 3.00 | 435CFS | 53.92AC-F | 425.92FT | 0.00FT | 40CFS | 2.82AC-F | 51.10AC-F | 51.10AC-F |
| 3.20 | 464CFS | 61.35AC-F | 426.05FT | 0.00FT | 48CFS | 3.55AC-F | 57.79AC-F | 57.79AC-F |
| 4.00 | 394CFS | 89.71AC-F | 426.48FT | 0.00FT | 81CFS | 7.86AC-F | 81.85AC-F | 81.85AC-F |
| 5.00 | 306CFS | 118.64AC-F | 426.85FT | 0.00FT | 133CFS | 16.76AC-F | 101.88AC-F | 101.88AC-F |
| 6.00 | 219CFS | 140.33AC-F | 426.96FT | 0.00FT | 238CFS | 32.15AC-F | 108.18AC-F | 108.18AC-F |
| 7.00 | 131CFS | 154.80AC-F | 426.91FT | 0.00FT | 182CFS | 49.58AC-F | 105.21AC-F | 105.21AC-F |
| 8.00 | 44CFS | 162.03AC-F | 426.82FT | 0.00FT | 115CFS | 61.91AC-F | 100.11AC-F | 100.11AC-F |
| 8.50 | 0CFS | 162.94AC-F | 426.75FT | 0.00FT | 104CFS | 66.46AC-F | 96.48AC-F | 96.48AC-F |
| 10.00 | 0CFS | 162.94AC-F | 426.53FT | 0.00FT | 85CFS | 78.26AC-F | 84.67AC-F | 84.67AC-F |
| 12.00 | 0CFS | 162.94AC-F | 426.30FT | 0.00FT | 67CFS | 90.94AC-F | 71.99AC-F | 71.99AC-F |
| 16.00 | 0CFS | 162.94AC-F | 425.97FT | 0.00FT | 43CFS | 109.25AC-F | 53.68AC-F | 53.68AC-F |

PLAINVILLE DAM 1 HR STM FLOOD ROUTING JGM 12/19/79

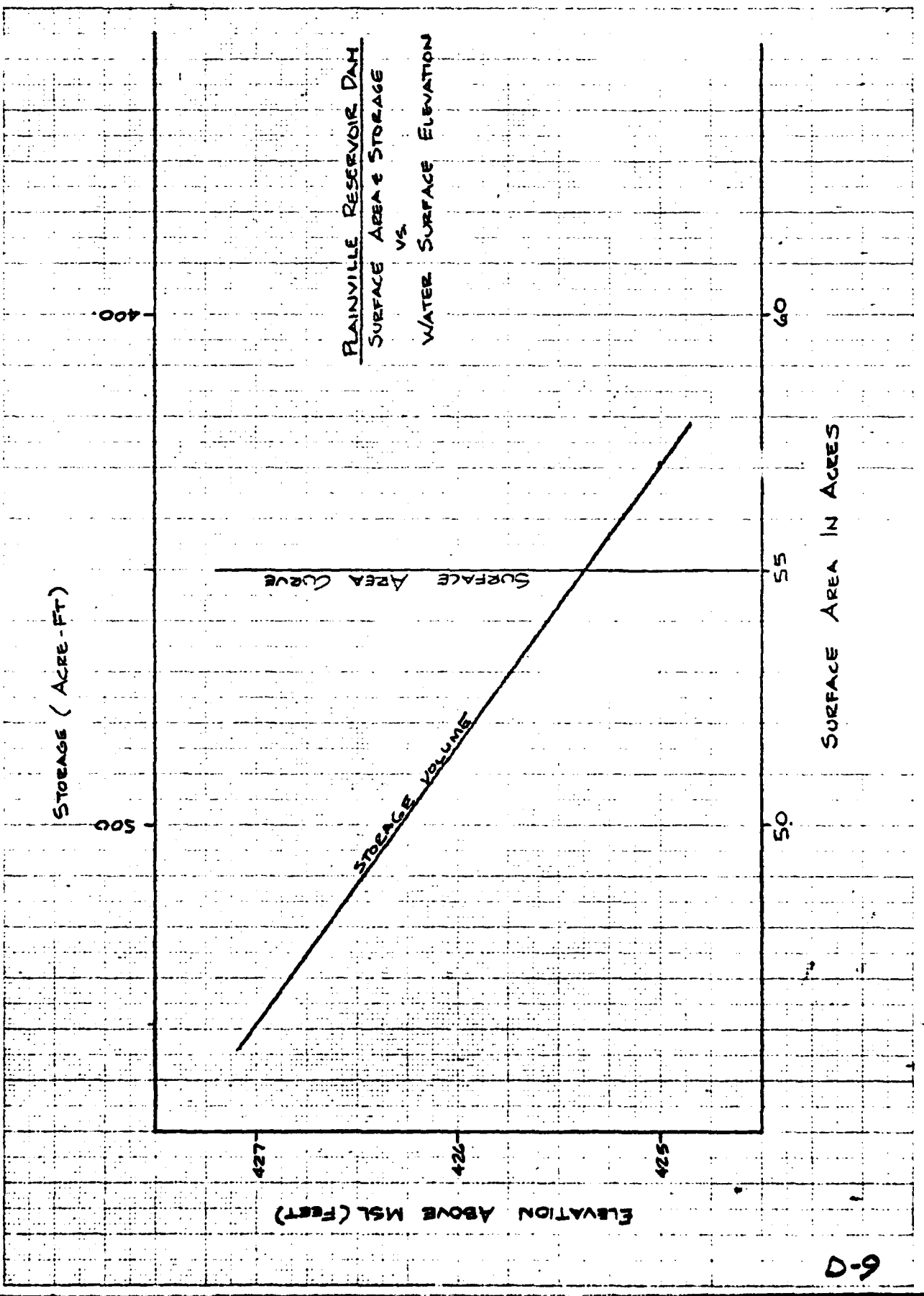
INPUT DATA: UNSUBMERGED WEIR
SEGMENT 1 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 585 ELEVATION OF WEIR = 426.8
SEGMENT 2 DISCHARGE COEFFICIENT = 3 LENGTH OF WEIR = 15 ELEVATION OF WEIR = 425
SEGMENT 3 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 88 ELEVATION OF WEIR = 426.8
IE=425.0 IV= 0.0 E=425.0 A= 55.00 E=440.0 A= 55.00

| HOUR | INFLOW | MASS INFLOW | WATER EL. | TAIL WATER | OUTFLOW | MASS OUTFLOW | STORAGE(R) | STORAGE(A) |
|---|---|---|---|---|---|---|---|---|
| 0.00 | 0CFS | 0.00AC-F | 425.00FT | .00FT | 0CFS | 0.00AC-F | 0.00AC-F | 0.00AC-F |
| 0.20 | 275CFS | 2.27AC-F | 425.04FT | 0.00FT | 0CFS | 0.00AC-F | 2.26AC-F | 2.27AC-F |
| 0.40 | 552CFS | 9.10AC-F | 425.16FT | 0.00FT | 3CFS | 0.03AC-F | 9.07AC-F | 9.07AC-F |
| 0.60 | 825CFS | 20.48AC-F | 425.36FT | 0.00FT | 10CFS | 0.13AC-F | 20.34AC-F | 20.34AC-F |
| 0.68 | 935CFS | 26.30AC-F | 425.47FT | 0.00FT | 14CFS | 0.22AC-F | 26.08AC-F | 26.08AC-F |
| 0.80 | 835CFS | 35.08AC-F | 425.63FT | 0.00FT | 22CFS | 0.40AC-F | 34.67AC-F | 34.67AC-F |
| 1.00 | 667CFS | 47.49AC-F | 425.84FT | 0.00FT | 35CFS | 0.88AC-F | 46.61AC-F | 46.61AC-F |
| 1.20 | 500CFS | 57.14AC-F | 426.01FT | 0.00FT | 45CFS | 1.55AC-F | 55.58AC-F | 55.58AC-F |
| 1.40 | 334CFS | 64.03AC-F | 426.12FT | 0.00FT | 53CFS | 2.37AC-F | 61.66AC-F | 61.66AC-F |
| 1.60 | 167CFS | 68.17AC-F | 426.17FT | 0.00FT | 57CFS | 3.28AC-F | 64.88AC-F | 64.88AC-F |
| 1.80 | 0CFS | 69.55AC-F | 426.18FT | 0.00FT | 58CFS | 4.24AC-F | 65.30AC-F | 65.30AC-F |

PROJECT
Plainville Reservoir Dam

**FLAHERTY-GIAVARA ASSOCIATES**
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 9 OF
BY WJN DATE 12/18/79
CHK'D. BY PB DATE 12/18/79

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PROJECT Plainville Dam

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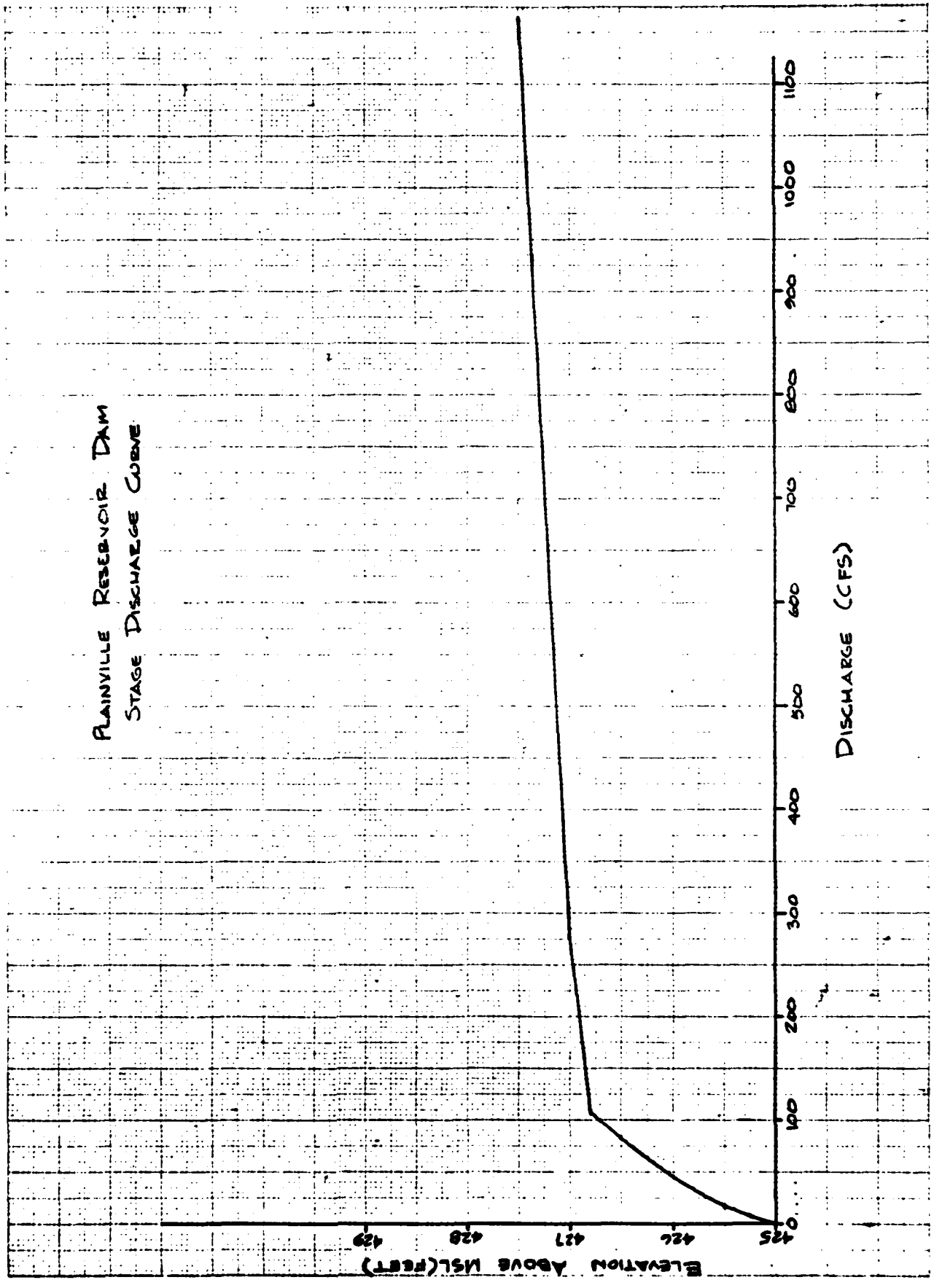
SHEET NO. 10 OF
BY WJN DATE 12/10/79
CHK'D. BY PB DATE 12/18/79



PLAINVILLE RESERVOIR DAM 79-90-1 DKS 12/17/79

# FGA FLOOD WAVE ROUTING

APPROXIMATE FLOOD WAVE ROUTING BASED UPON U.S. ARMY CORPS OF ENGINEERS' "RULE OF THUMB GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS" DATED APRIL, 1978.

INITIAL STATION = 0 +0
INITIAL WAVE HEIGTH = 17.0 FT
ASSUMED BREACH WIDTH = 275.0 FT
INITIAL RESERVOIR STORAGE = 528 ACRE-FT
COMPUTED FLOOD WAVE PEAK FLOW = 32,388 CFS

## STATION 4+50

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -1000.0 FT | 440.0 FT | -500.0 FT | 430.0 FT | -300.0 FT | 420.0 FT |
| -170.0 FT | 410.0 FT | -50.0 FT | 400.0 FT | -6.0 FT | 398.0 FT |
| | | N = 0.040 | | | |
| -6.0 FT | 398.0 FT | -3.0 FT | 396.0 FT | 3.0 FT | 396.0 FT |
| 6.0 FT | 398.0 FT | | | | |
| | | N = 0.080 | | | |
| 6.0 FT | 398.0 FT | 50.0 FT | 400.0 FT | 140.0 FT | 410.0 FT |
| 400.0 FT | 450.0 FT | | | | |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 987.6 SF | 157.2 FT | 0.080 | 13.2 FPS | 13,100CFS |
| 154.7 SF | 13.2 FT | 0.040 | 40.1 FPS | 6,222CFS |
| 855.1 SF | 129.1 FT | 0.080 | 13.7 FPS | 11,747CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 396.0 FT | 13.3 FT | 409.3 FT | 1,997 SF | 15.5 FPS | 31,070 CFS | 0.0440 |

# STATION 8+10

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -2550.0 FT | 400.0 FT | -250.0 FT | 400.0 FT | -100.0 FT | 390.0 FT |
| -6.0 FT | 382.0 FT | | | | |
| | | N = 0.040 | | | |
| -6.0 FT | 382.0 FT | -3.0 FT | 380.0 FT | 3.0 FT | 380.0 FT |
| 6.0 FT | 382.0 FT | | | | |
| | | N = 0.080 | | | |
| 6.0 FT | 382.0 FT | 180.0 FT | 400.0 FT | 450.0 FT | 420.0 FT |
| 580.0 FT | 410.0 FT | 950.0 FT | 410.0 FT | 1070.0 FT | 450.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 542.5 SF | 118.0 FT | 0.080 | 21.1 FPS | 11,489CFS |
| 132.8 SF | 13.2 FT | 0.040 | 71.3 FPS | 9,485CFS |
| 443.0 SF | 93.0 FT | 0.080 | 21.6 FPS | 9,603CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 380.0 FT | 11.5 FT | 391.5 FT | 1,118 SF | 27.3 FPS | 30,578 CFS | 0.1700 |

# STATION 13+50

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -1200.0 FT | 300.0 FT | -850.0 FT | 250.0 FT | -600.0 FT | 240.0 FT |
| -200.0 FT | 240.0 FT | -20.0 FT | 230.0 FT | -6.0 FT | 222.0 FT |
| | | N = 0.040 | | | |
| -6.0 FT | 222.0 FT | -3.0 FT | 220.0 FT | 3.0 FT | 220.0 FT |
| 6.0 FT | 222.0 FT | | | | |
| | | N = 0.080 | | | |
| 6.0 FT | 222.0 FT | 630.0 FT | 250.0 FT | 800.0 FT | 260.0 FT |
| 1100.0 FT | 270.0 FT | 1270.0 FT | 290.0 FT | 1920.0 FT | 300.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 83.5 SF | 36.6 FT | 0.080 | 13.3 FPS | 1,115CFS |
| 127.6 SF | 13.2 FT | 0.040 | 69.8 FPS | 8,919CFS |
| 930.0 SF | 203.8 FT | 0.080 | 21.1 FPS | 19,711CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 220.0 FT | 11.1 FT | 231.1 FT | 1,141 SF | 26.0 FPS | 29,746 CFS | 0.1720 |

# STATION 26 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -700.0 FT | 180.0 FT | -450.0 FT | 180.0 FT | -150.0 FT | 180.0 FT |
| | | N = 0.040 | | | |
| -150.0 FT | 180.0 FT | 0.0 FT | 178.0 FT | 250.0 FT | 180.0 FT |
| | | N = 0.080 | | | |
| 250.0 FT | 180.0 FT | 1900.0 FT | 190.0 FT | 2300.0 FT | 200.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 1,267.0 SF | 550.0 FT | 0.080 | 5.0 FPS | 6,360CFS |
| 1,321.5 SF | 400.0 FT | 0.040 | 12.7 FPS | 16,870CFS |
| 437.8 SF | 380.1 FT | 0.080 | 3.1 FPS | 1,384CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 178.0 FT | 4.3 FT | 182.3 FT | 3,026 SF | 8.1 FPS | 24,615 CFS | 0.0240 |

# STATION 33 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -800.0 FT | 180.0 FT | -220.0 FT | 180.0 FT | | |
| | | N = 0.040 | | | |
| -220.0 FT | 180.0 FT | 0.0 FT | 177.0 FT | 200.0 FT | 180.0 FT |
| | | N = 0.080 | | | |
| 200.0 FT | 180.0 FT | 1000.0 FT | 180.0 FT | | |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 2,425.6 SF | 580.0 FT | 0.080 | 1.5 FPS | 3,698CFS |
| 2,386.5 SF | 420.0 FT | 0.040 | 3.7 FPS | 8,926CFS |
| 3,345.7 SF | 800.0 FT | 0.080 | 1.5 FPS | 5,101CFS |

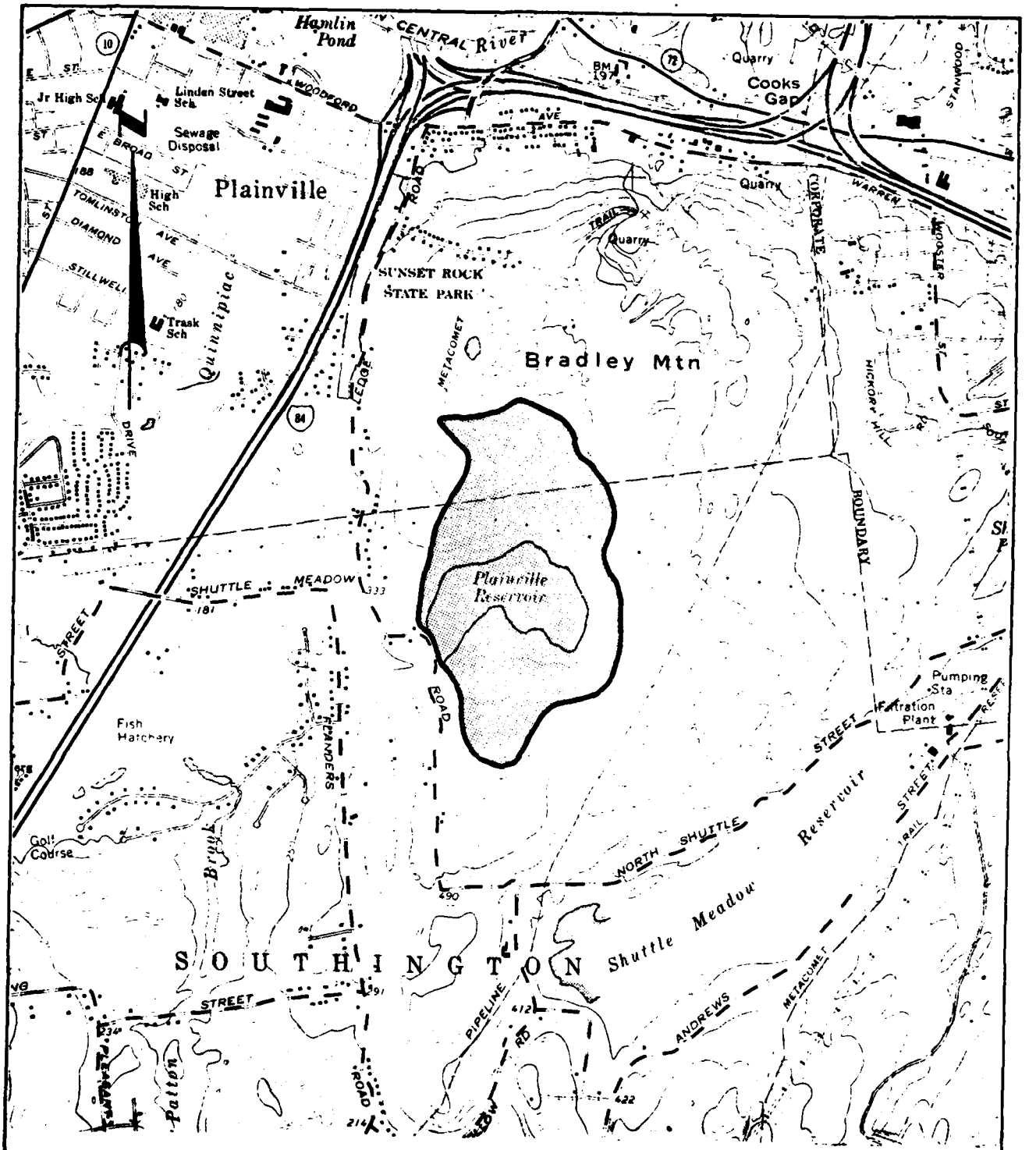
| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 177.0 FT | 7.1 FT | 184.1 FT | 8,157 SF | 2.1 FPS | 17,726 CFS | 0.0010 |

# STATION 41 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|---|---|---|---|---|---|
| | | N = 0.080 | | | |
| -2500.0 FT | 190.0 FT | -480.0 FT | 180.0 FT | | |
| | | N = 0.040 | | | |
| -480.0 FT | 180.0 FT | 0.0 FT | 176.0 FT | 220.0 FT | 180.0 FT |
| | | N = 0.080 | | | |
| 220.0 FT | 180.0 FT | 450.0 FT | 180.0 FT | 3550.0 FT | 190.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|---|---|---|---|---|
| 817.4 SF | 574.6 FT | 0.080 | 0.7 FPS | 607CFS |
| 3,391.4 SF | 700.0 FT | 0.040 | 3.3 FPS | 11,407CFS |
| 1,908.8 SF | 1111.9 FT | 0.080 | 0.8 FPS | 1,607CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|---|---|---|---|---|---|---|
| 176.0 FT | 6.8 FT | 182.8 FT | 6,117 SF | 2.2 FPS | 13,621 CFS | 0.0010 |



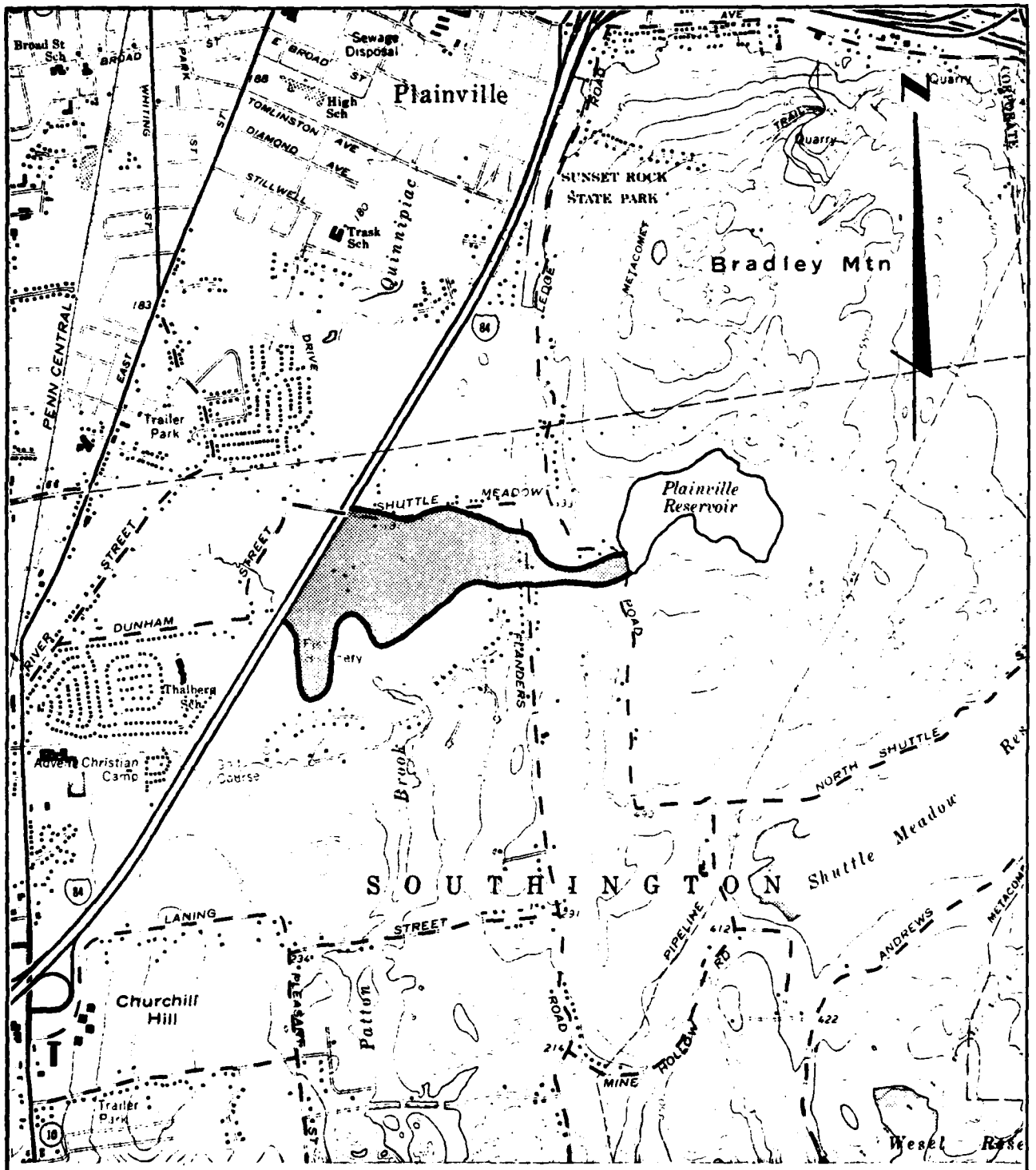

# PLAINVILLE RESERVOIR DAM

## DRAINAGE MAP

SOUTHINGTON, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

D-17




# PLAINVILLE RESERVOIR DAM
# DAM FAILURE ANALYSIS
# IMPACT AREAS

SOUTHINGTON, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

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# APPENDIX E

## INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS